

FLIGHT

First Aero Weekly in the World.

Founder and Editor : STANLEY SPOONER.

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

No. 404. (No. 38, Vol. VIII.)

SEPTEMBER 21, 1916.

Weekly, Price 1d.
Post Free, 1½d.

Flight.

Editorial Office: 44, ST. MARTIN'S LANE, LONDON, W.C.
Telegrams: Truditur, Westrand, London. Telephone: Gerrard 1828.
Annual Subscription Rates, Post Free.
United Kingdom .. 6s. 6d. Abroad .. 11s. 6d.

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TO OUR READERS.

The Supply of "FLIGHT." Important Notice.

Order "FLIGHT" to be either delivered or reserved for you regularly.

As the demand for "FLIGHT" is so great each week, it is of the utmost importance that readers should place their orders *firmly* for copies of "FLIGHT" at the bookstalls, their newsagents, or direct from the publishers, at 44, St. Martin's Lane, W.C., if they wish to secure a copy every week and avoid disappointment. The stringent Government restrictions in regard to the supply of printing paper necessitates this precaution in order that only actual numbers required are printed, and all wastage by unsold copies may thereby be reduced to a minimum, if not eliminated.

THE PUBLISHERS.

EDITORIAL COMMENT.



WHILE we were admittedly caught unprepared in armament and equipment at the outbreak of war, even the Germans must now admit that we have to the full risen to the occasion. For 40 years Germany had impressed into her preparations for war all the manifold resources of engineering and chemical science, while we stood on one side and watched with arms figuratively folded, at least so far as our land services were concerned. But since the

fateful August of two years ago we "Tanks." have indeed made enormous advances in invention and equipment for the ungentle art of war, and more than one have been the surprises sprung upon the common enemy. Of some we cannot speak until the end of the war removes the embargo on speech and writing; but of the latest, "Tanks," it is possible to speak now with some amount of freedom. There is no need to again traverse the ground covered by the story of their first appearance on the Somme, where they certainly gave the Germans one of the major surprises of the war, and, incidentally, at the same time disproved the prevalent idea that we cannot keep a secret from the German intelligence system. The fact that these new engines of war were in process of construction was known to many, and yet not a whisper got abroad, and the general mass of the public knew no more about the great surprise preparing than the enemy himself.

The credit for the inception of these vehicles belongs to the Royal Navy. It is a matter of history that it was the Royal Naval Air Service which pioneered the armoured car, and it was under the Navy that its possibilities were demonstrated in France and Belgium and in South-West and East Africa. The earlier types were admittedly in the nature of a compromise. Armoured cars did not exist in the British service when war broke out, and no experimental work had been done in the direction of evolving a fighting car for the purposes of war. Therefore, the best that could be done was to adapt the best obtainable touring chassis to carry armour and guns. Later, the type developed somewhat, and we had the heavy armoured lorry, capable of carrying heavier metal, though moving necessarily at a slower speed.

Both these types did well, but, as has already been said, they were compromises designed more to fill a gap than to be of a permanent character. Therefore, much experimental work was inaugurated and carried on along the lines of the present "Tanks." This experimental work received the enthusiastic support of Mr. Winston Churchill, First Lord of the Admiralty, and of Commodore Sueter, then Director of the Air Department, who may justly be described as the pioneer of the armoured car in the British service. As he pioneered the submarine and the aeroplane, so he pioneered the heart and soul into the development of the armoured car. Thus it came about that when, a little more than a year ago, it was decided from motives of policy that the Army should take over the armoured car, the new design was practically past the experimental stage.

As to who was actually the first man to promulgate the idea of these "Tanks," together with drawings, &c. is another matter.

It was fortunate that so able and progressive an officer as Col. Swinton should have been detailed to handle the new arm and give practical effect to the work that had been done under the ægis of the Admiralty, and that he should have been ably seconded by others like Major Stern and Capt. Symes, who had been closely associated with Commodore Sueter in the development of the fighting car since the early days of the war.

◆ ◆ ◆

Who Conceived the "Tanks"? Since Sir Douglas Haig reported on the extraordinary success achieved by the "Tanks," the whole Press of the country has been busy awarding the credit of their conception to endless people. Everyone who has been even remotely connected with their development has been awarded praise. Mr. Winston Churchill, who was at the Admiralty when the "Tank" experiments were inaugurated; Col. Swinton, who took over the direction of the practically completed experiments when the Armoured Car Division was handed over to the Army; and half-a-dozen others have been named, but no one appears to have remembered—if, indeed they knew—that the first suggestion of employing the type for fighting came from Lieut. Macfie, who in the early days of aviation was prominently identified with the movement. The full story cannot be told now. It is one of those that must remain untold till the end of the war. As we have noted above, Mr. Churchill and Commodore Sueter gave every encouragement to the idea of adapting a particular form of traction to armoured car purposes, but credit where credit is due. It was Macfie who first urged the suitability of the type.

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How Neutrals Hear the "Truth." The *Daily Mail* has been unmasked! We have it on the authority of the *Vossische Zeitung* that our contemporary always prints two editions. One contains the truth, for home consumption; the other, pretty articles to impress the neutrals. Apparently, it is the edition for neutrals that has been reaching the Editorial breakfast table, for we have remained in ignorance up to now of the destruction of the Houses of Parliament, among other fearful

havoc, which the truthful edition of the *Mail* tells us all about. No wonder we live in a fool's paradise, when our leading journals suppress the truth in this double-handed way, so to speak.

Seriously, though, the Germans must be feeling the pinch pretty badly when they are reduced to perpetrating forgeries of our daily journals to get their own people and those of neutral countries to believe their mendacities relating to their abortive air raids on England. We take it they are quite prepared for the post-war results of their methods? One result of these must inevitably be that no one will ever take the word of a "Hunzollern," even though it were backed by all the affidavits ever sworn. They must go through history branded as a nation of liars, with whom no decent man may have dealings save at his peril.

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Prize Money for Zepp. Destroyers.

The *Investors' Guardian* of the 9th inst. makes the interesting suggestion that the Naval system of awarding prize-money should be extended to the air services. The contention put forward in support of the idea is, it is only right and proper when the skill and daring required for the successful dealing in the air with the Zeppelin menace are taken into account, some tangible mark of the country's appreciation should be awarded. The *Investors' Guardian* assesses that appreciation at £1,000. There are arguments for and against. In the first place, it has to be noted that the suggested reward would take the shape of a purely personal gratuity, differing thereby from the Naval system, in which the prize-money is shared by all concerned in the deed for which it is awarded. If the system were to be logically carried out, the prize-money would have to be divided *pro rata* among everyone concerned, in which case the sum noted would not go very far. If, however, it is to be purely a personal gratuity to the aviator who actually is fortunate enough to deal the *coup de grace* to an airship which has been previously disabled either by gunfire or by bombing by a less fortunate airman, then the incidence of the reward would scarcely be fair.

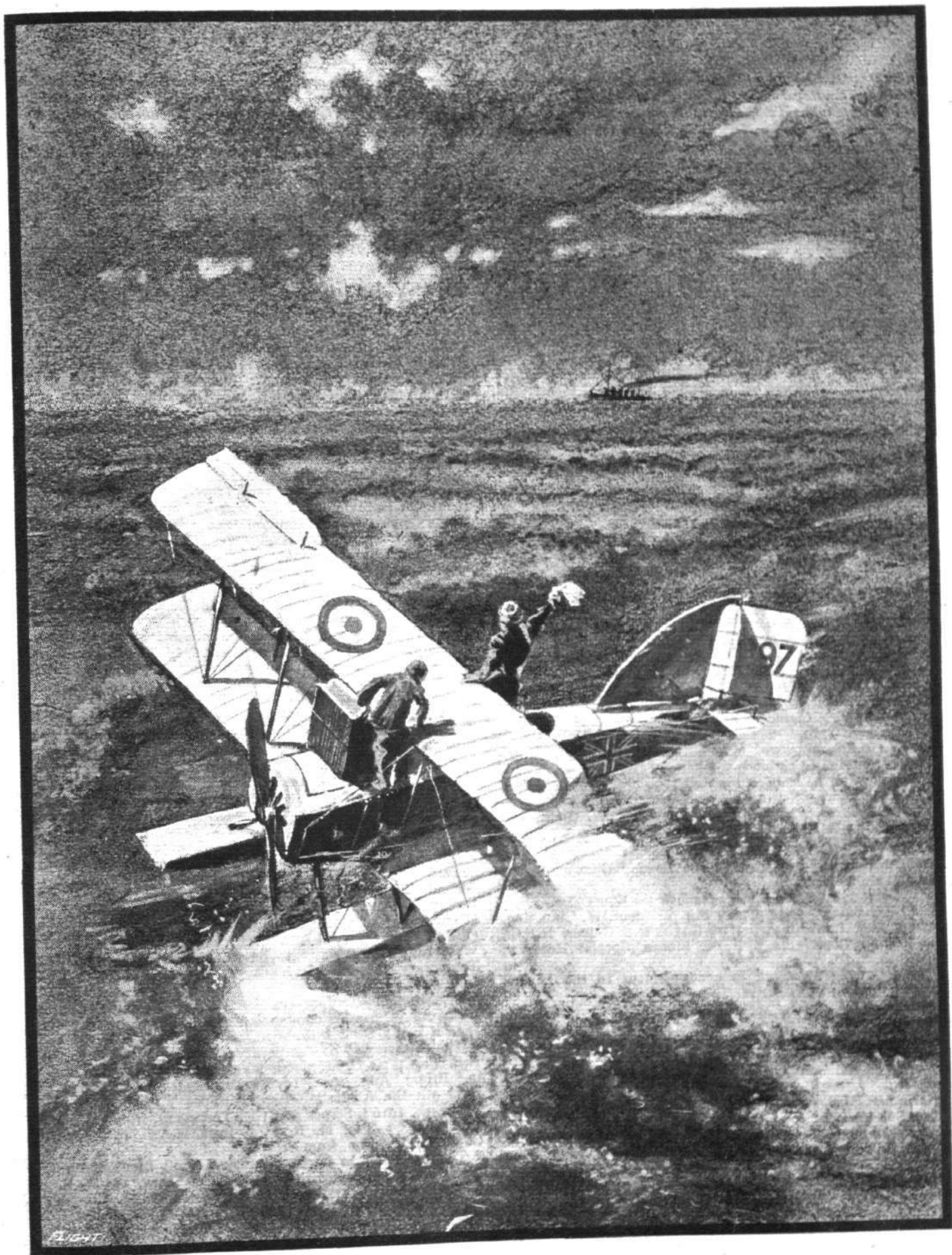
All are in favour of recognising—and recognising handsomely—the superlative gallantry of our flying services, but we confess we are rather at a loss to see how in this matter justice can be done to one without the risk of injustice to others. Probably the best method of dealing with the question would be to authorise the allocation of so much prize-money for the destruction of enemy aircraft, to be granted or not in the discretion of the competent authorities, and, if granted, to be allocated as decided by them. But whatever shape the idea may or may not ultimately take, the question is at least one that will bear examination.

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New Prizes for Zepp. Strafers.

A PRIZE of £500 has been offered by Mr. J. W. Isherwood, the inventor of the system of ship construction bearing his name, to the next aviator to bring down a Zeppelin on British soil.

A similar prize has also been put up by Commander Sir Edward Nicholl, R.N.V.R., of Cardiff.



GUARDING OUR COASTS.—A naval patrol in difficulties in the North Sea.

The British Air Service

"PER ARDUA AD ASTRA"

Under this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, it is not repeated in this column.

Royal Naval Air Service.

THE following appeared in the *London Gazette* of September 12th:—

Temporary Lieut. H. Jullerot, R.N.V.R., is to be Honorary Flight-Lieutenant; Aug. 4th, 1916, and not Temporary Flight-Lieutenant as previously stated.

The following appeared among the Admiralty announcements of September 13th:—

Mr. H. L. F. McLean entered as Probationary Flight-Sub-Lieutenant (Temporary), seniority June 7th, and appointed to "President," additional, for R.N.A.S. The following have been entered as Probationary Flight Officers (Temporary), seniority Sept. 17th, and appointed to "President," additional, for R.N.A.S.: Lieut. (Temporary, R.N.V.R.) L. G. Wright, Sub-Lieut. (Temporary, R.N.V.R.) M. H. Rattray, Air-Mechanics W. L. Jordan and F. G. Horstmann, Leading Mechanic A. M. O. McLachlan and Second Lieut. (12th R. Warw. R.) K. V. Stratton.

The following appeared among the Admiralty announcements of September 14th:—

A. D. Carey entered as Probationary Flight Officer (Temporary), seniority Sept. 24th, and appointed to "President," additional, for R.N.A.S.

The following appeared among the Admiralty announcements of September 16th:—

Lieut.-Com. H. N. M. Hardy, D.S.O., graded as Flight Commander, to date Sept. 15th.

Messrs. J. T. Clutty and E. A. B. Tooth granted temporary commissions as Sub-Lieutenants, R.N.V.R., with seniority Sept. 15th.

The following have been entered as Probationary Flight Officers, for temporary service, all to date Sept. 17th: H. W. Badman, D. Balmain, C. R. Derington-Turner, W. J. Coast, P. B. Silk, C. L. Price, E. N. Jaquin, E. F. Burrowes, J. W. Beebee and R. G. Saunders.

Petty Officer (R.N.A.S.) A. E. Watson granted temporary commission as Engineer Sub-Lieutenant, R.N.R., with seniority Sept. 12th.

The following appeared among the Admiralty announcements of September 18th:—

The following have been granted temporary commissions, R.N.V.R., seniority Sept. 16th, and all appointed to "President," additional, for R.N.A.S.: Lieuts. S. W. Godin and J. G. Dothie; Sub-Lieuts. L. Marsh and R. Redfern.

Royal Flying Corps (Military Wing).

THE following appeared in the *London Gazette* of September 12th:—

Temporary Appointments made at the War Office.

Staff Lieutenant.—Temporary Second Lieut. H. Cumming, General List, from an Assistant Equipment Officer, R.F.C., vice Second Lieut. H. J. de C. Moore, Special Reserve; Aug. 29th, 1916.

The following appeared in a supplement to the *London Gazette* issued on September 13th:—

Experimental Officers (graded as Equipment Officers).—July 9th, 1916: Capt. R. B. Bourdillon, Special Reserve from an Assistant Equipment Officer; Lieut. B. M. Jones, R.E. (T.F.), and to be Temporary Captain whilst so employed. (Substituted for notification in the *Gazette* of Aug. 24th, 1916.)

Assistant Equipment Officer.—Second Lieut. G. B. Redgrave, Special Reserve; Sept. 4th, 1916.

Memorandum.—Temporary Second Lieut. S. T. Welch, General List, relinquishes his commission on ceasing to be employed with R.F.C.; Sept. 14th, 1916.

Supplementary to Regular Corps.—Second Lieut. (on probation) T. R. Hancock resigns his commission; Sept. 14th, 1916.

The following appeared in a supplement to the *London Gazette* issued on September 14th:—

Flight Commander.—Temporary Second Lieut. M. D. Barber, General List, from a Flying Officer, and to be Temporary Captain whilst so employed; Aug. 21st, 1916.

Flying Officers.—Second Lieut. O. T. Sloan, Sco. Rif. (T.F.); July 2nd, 1916. Aug. 16th, 1916: Lieut. J. W. Warren, Canadian General List; Temporary Second Lieut. J. L. B. Baggs, Welsh R., and to be transferred to the General List; Second Lieut. C. D. Bennett, Special Reserve. Temporary Second Lieut. A. B. Raymond Barker, General List; Aug. 18th, 1916. Aug. 19th, 1916: Second Lieutenants, Special Reserve: I. B. Hart-Davies, S. C. Maytom, F. L. Luxmoore. Second Lieut. W. R. D. Shaw, 7th Essex R. (T.F.), to relinquish his appointment; Aug. 21st, 1916.

Flying Officers (Observers).—Temporary Lieut. E. L. Williams, E. York R., and to be transferred to the General List; March 4th, 1916. Aug. 25th, 1916: Temporary Lieut. F. L. B. Hebbert, R.A., and to be transferred to the General List; Temporary Lieut. R. Johnstone, R.A., and to be transferred to the General List. Temporary Second Lieut. F. Sharpe, Notts and Derby R.; Temporary Second Lieut. H. Brereton, L'pool R., and to be transferred to the General List; Aug. 26th, 1916. Aug. 27th, 1916: Lieut. (Temporary Capt.) J. S. G. Collie, R.F.A. (T.F.); Lieut. (Temporary Capt.) K. A. Brooke Murray, A.S.C.

Balloon Officers.—Aug. 12th, 1916: Temporary Second Lieut. F. L. Simmons, R.W. Surr. R., and to be transferred to the General List; Temporary Second Lieut. W. G. Dreschfeld, Bord. R., and to be transferred to the General List; Temporary Second Lieut. H. Thrower, Arg. and Suth'd Highrs., and to be transferred to the General List; Temporary Second Lieut. H. S. Goodliffe, Notts and Derby R., and to be transferred to the General List; Temporary Second Lieut. C. H. Davies, E. K. R., and to be transferred to the General List; Second Lieut. (on probation) D. C. Bauer, Special Reserve; Temporary Second Lieut. C. W. Berry, General List. Second Lieutenants, Special Reserve: F. C. Mears, H. B. T. Hawkins, C. Clarke. T. G. G. Bolitho, from an Assistant Equipment Officer; Aug. 23rd, 1916.

Assistant Equipment Officers.—Second Lieut. (on probation) J. H. Robertson, Special Reserve; May 25th, 1916. Temporary Second Lieut. J. H. B. Burgess, General List; July 10th, 1916. Second Lieut. (on probation) F. C. Thomas, Special Reserve; July 16th, 1916. Second Lieut. (on probation) G. B. Wilkins, Special Reserve; July 19th, 1916. Aug. 1st, 1916: Second Lieut. D. B. James, Special Reserve, from a Balloon Officer; Second Lieut. C. N. Dore, Special Reserve; Second Lieut. H. G. Gibbs, special Reserve; Second Lieut. (on probation) W. H. Trinder, Special Reserve. Temporary Second Lieut. W. H. Rose, General List; Aug. 14th, 1916. Second Lieut. (on probation) J. R. Hembrough, Special Reserve; Aug. 19th, 1916. Aug. 22nd, 1916: Lieut. (Temporary Capt.) A. H. Guerrier, 3rd Co. of Lond. Yeo. (T.F.); Temporary Lieut. C. C. Barrett, 3rd Bn. British West Indies Regt., and to be transferred to General List. Temporary Second Lieut. G. E. Phillips, General List; Aug. 31st, 1916.

Memoranda.—Temporary Lieut. L. S. Williams, General List, relinquishes his commission on ceasing to be employed with R.F.C.; Sept. 15th, 1916.

The following to be Temporary Lieutenants, for duty with R.F.C.: Corpl. D. M. Macdonald, from 3rd Canadian Training Brig.; Aug. 19th, 1916. Act.-Sergt. J. M. Atherton, from 9th Bn. Australian Imperial Force; Aug. 31st, 1916. Sept. 4th, 1916: Sergt. R. G. R. Townsend, from Blundell's Sch. O.T.C.; Pte. H. Rosselli, from H.A.C. (T.F.); Pte. G. W. P. Davidson, from Canadian A.S.C.

The following to be Temporary Second Lieutenants (on probation) for duty with R.F.C.:—Sept. 5th, 1916: S. F. Allabarton, L. E. Baker, W. R. Balden, A. J. Chapman, H. R. Child, A. E. Gay, J. S. Green, A. G. Harrison, J. A. Inman, B. C. Jones, T. J. Kent, S. G. Knock, E. Marsden, F. Matthews, J. Nightingale, H. Roberts, A. A. Shaw, B. J. Silly, C. T. E. Smith, P. Tew, A. Appleby, H. C. H. Cooper. P. Evans, W. H. Gunner, E. D. Inskip, W. G. Milliship, J. H. Mitchell, A. V. Pearman, H. G. Tucker, D. J. W. Walker,

R. G. Weller, W. Woodward, A. C. Finlayson, T. B. Fraser, R. Littlejohn, A. D. Napier, D. W. L. Young, R. G. Clough, W. Coltman, A. E. Franklin, A. W. Gardner, D. Gordon, P. Haselock, H. J. Hinde, A. B. Jones, J. S. Leslie, N. E. Maitland, G. H. Palmer, R. B. Salisbury, H. Shaw, W. P. T. Watts, G. A. B. Wheldon, A. S. White, R. Applin, R. W. Binder, H. G. Downing, A. F. Elliott, J. H. Flynn, H. T. Garrett, J. F. Grose, E. Holman, R. E. Jeffery, C. G. Larkin, H. V. Long, H. G. Neville, F. A. W. Mann, Iowerth ap R. Owen, A. B. Peters, E. D. Soar, R. S. Twigg, R. P. O. Weekes, J. H. Westlake, H. G. Wood, R. W. T. Bodilly, L. E. Lomas, P. H. B. Ward, J. R. Wilson, L. J. Bailey, F. E. Bishop, E. Brewer, J. W. Brown, F. P. Brown, A. L. Ballard, A. B. Bullock, R. S. Davies, N. H. Dimmock, C. F. Frank, G. F. Hunter, A. V. Hurley, E. A. James, P. G. Kelsey, A. F. Kemp, E. R. Law, R. F. Malabar, A. L. Messenger, B. Ord, R. W. Redding, A. I. Riley, J. K. Ross, S. A. Salmon, F. L. Smith, H. F. Walker, H. E. Waters, E. D. Whittles, C. E. Worthington, T. F. Braines, L. Cable, H. Cooke-Smith and L. S. R. Poole.

The following appeared in the *London Gazette* of September 15th:—

Flying Officers.—Aug. 16th, 1916: Temporary Second Lieutenants, General List: G. C. Body, F. P. Kane, I. V. Pyott. Second Lieut. (on probation) M. C. Mossop, Special Reserve. Second Lieut. (Temporary Lieut.) R. Corbett, W. Som. Yeo. (T.F.), from a Flying Officer (Observer). Aug. 17th, 1916. Second Lieutenants (on probation), Special Reserve. Aug. 19th, 1916: H. H. Griffith, G. W. Dampier. Temporary Second Lieutenants, General List: C. C. Gibbs and G. F. Lines.

Flying Officer (Observer).—Temporary Second Lieut. D. K. Paris, R.A., and to be transferred to the General List: June 1st, 1916.

Memorandum.—Temporary Second Lieut. D. H. Broughton.

General List, relinquishes his commission on ceasing to be employed with R.F.C.; Aug. 31st, 1916.

The following appeared in a supplement to the *London Gazette* issued on September 16th:—

Park Commander.—Capt. T. E. Robertson, Special Reserve, from an Equipment Officer, and to be Temporary Major whilst so employed; Sept. 1st, 1916.

Supplementary to Regular Corps.—The under-mentioned Second Lieutenants (on probation) are confirmed in their rank: S. M. Baber, A. W. Grigsby, F. W. Roberts, D. C. Bauer. The under-mentioned to be Second Lieutenants:—July 1st, 1916: E. G. Boulenger, L. S. S. Northcote.

The following appeared in a supplement to the *London Gazette* issued on September 18th:—

Memoranda.—The appointment of 2nd Class Air-Mechanic A. H. Bates to be Temporary Second Lieutenant, notified in the *Gazette* of Aug. 24th, 1916, is cancelled.

To be Temporary Second Lieutenants for duty with R.F.C.: Cadet T. Huggan, from Marlborough Coll. O.T.C.; Sept. 16th, 1916. Sept. 18th, 1916: Corpl. B. O. Angell, from Artists' Rifles O.T.C.; Cadet A. B. Cort, from Notts Univ. O.T.C.

Supplementary to Regular Corps.—Second Lieutenants (on probation) confirmed in their rank: M. C. Mossop, H. H. Griffith, N. A. Phillips and R. C. M. Smith.

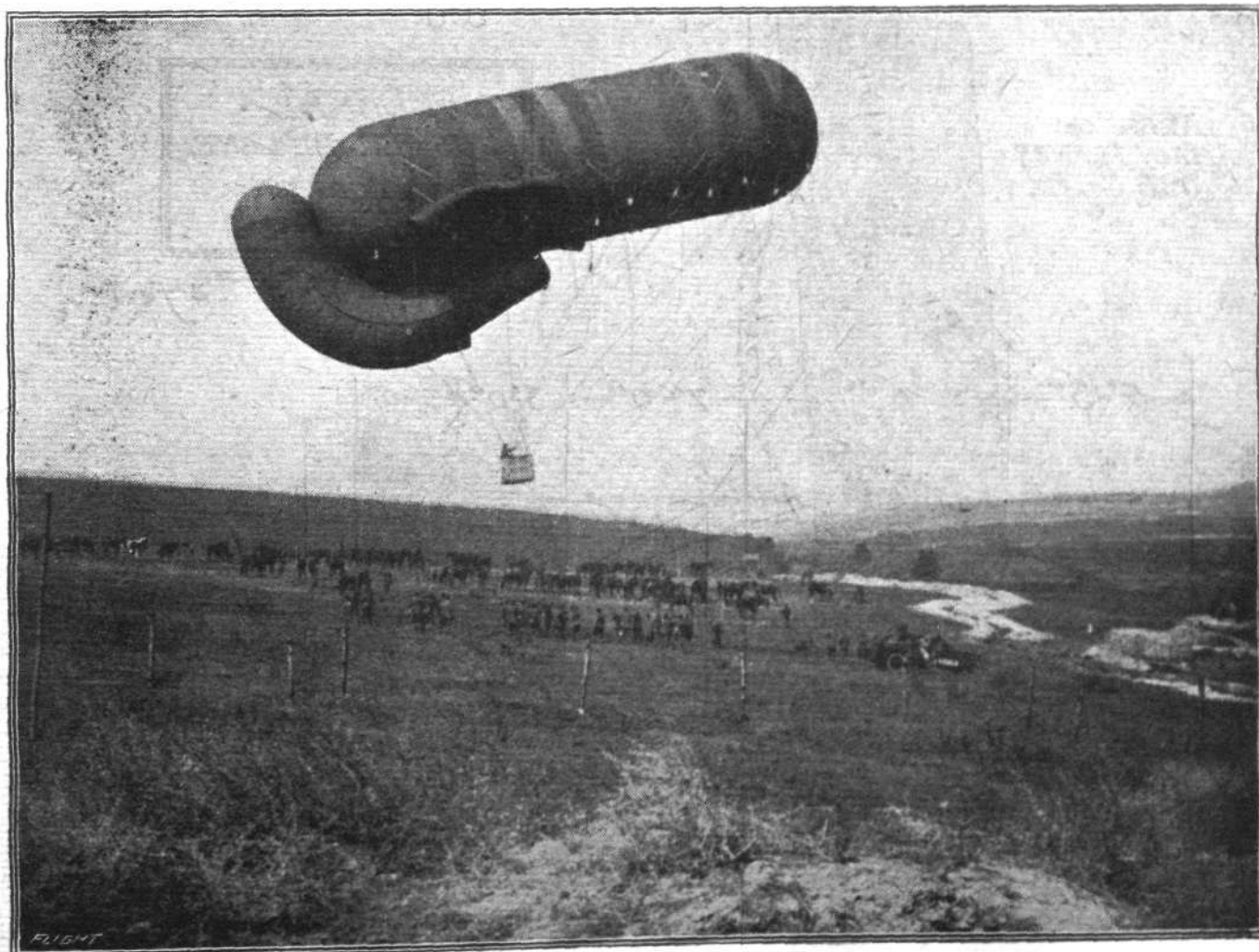
George W. A. Brown to be Second Lieutenant; Aug. 14th, 1916.

To be Second Lieutenants (on probation):—Sept. 4th, 1916: G. D. Thane-Parker, C. G. Mallous, S. F. Brown. Sept. 18th, 1916: F. R. L. Taylor, C. C. Villa, H. Seymour, S. Roche, E. H. Dimmock, J. B. Thomas and G. C. Morris.

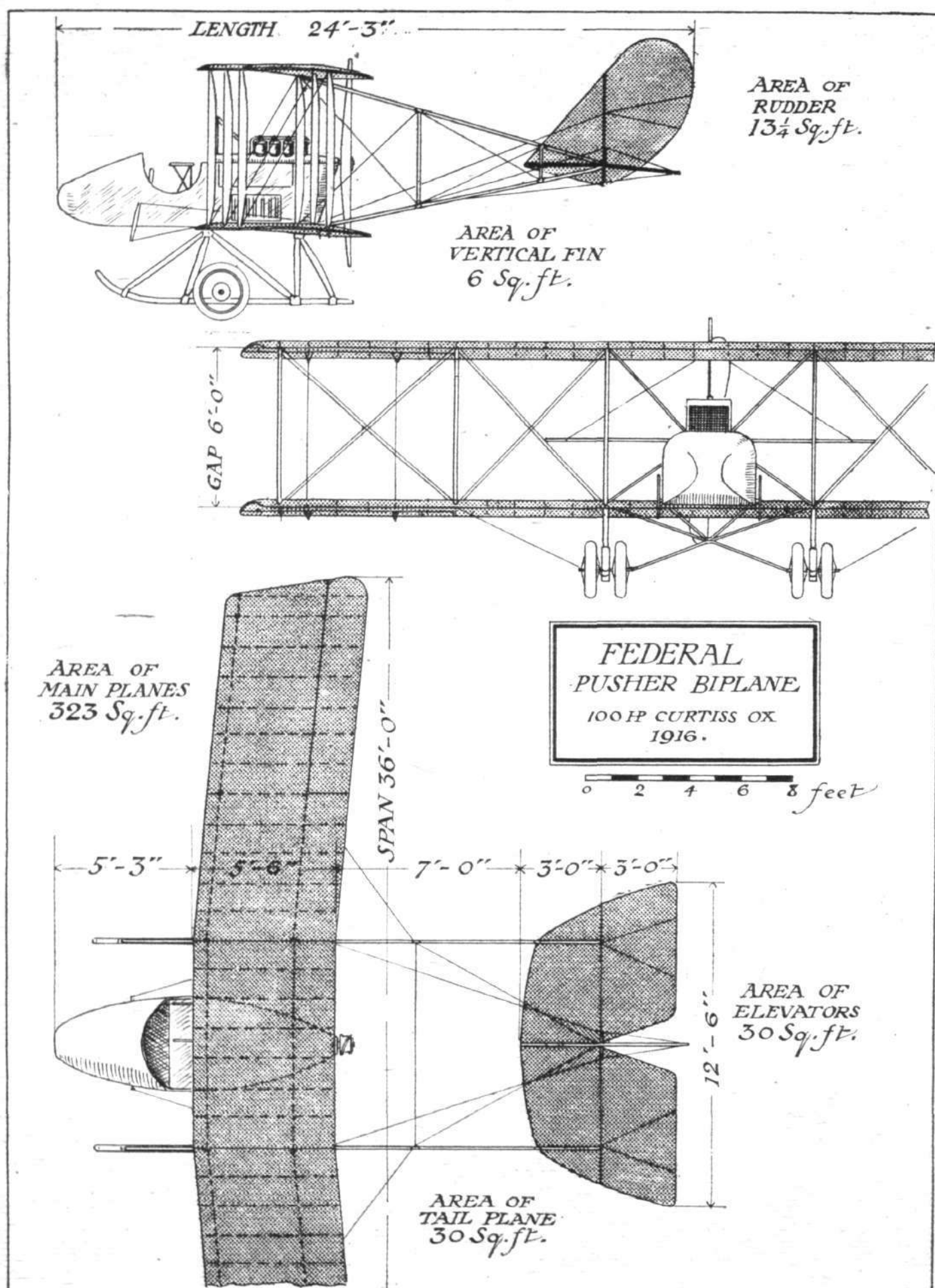
Royal Flying Corps (Territorial Force).

The following appeared in a supplement to the *London Gazette* issued on September 18th:—

Hampshire Aircraft Parks.—S. M. S. Blackman to be Second Lieutenant; Sept. 19th, 1916.



ON THE FRONT IN FRANCE.—An observation balloon coming to earth. Note the lines of trenches stretching away in the far distance, barbed wire, &c. (Official photo. issued by the Press Bureau.)



THE FEDERAL PUSHER BIPLANE.—Plan, side and front elevation to scale.

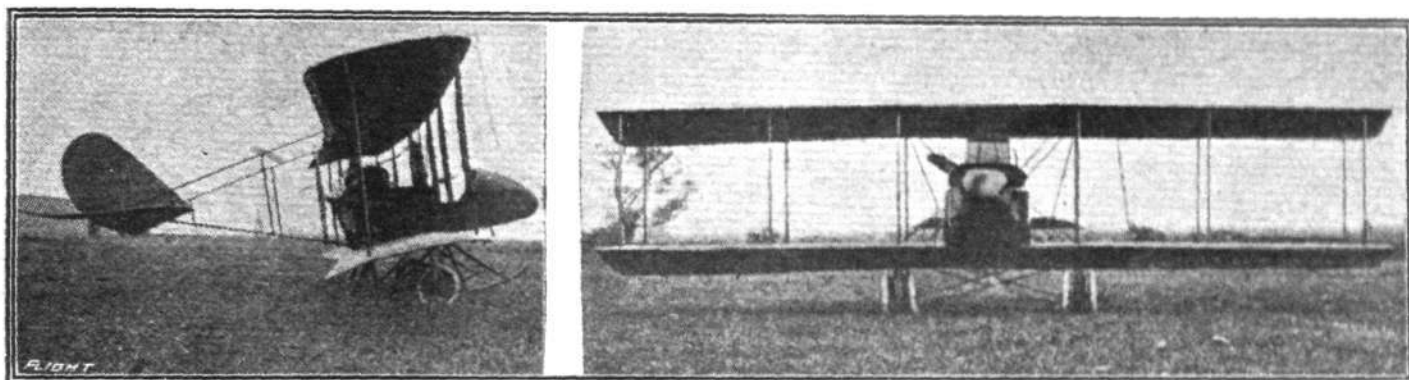
THE FEDERAL PUSHER BIPLANE.

ONE of the latest recruits to the aeronautical industry in America is the Federal Aircraft and Motor Corporation of New York, which has been formed for the purpose, not only of manufacturing machines of various types to their own designs, but with a view of conducting a flying school at New York City. The machines in use for this latter branch include a Curtiss flying boat and a Martin tractor, as well as a 100 h.p. pusher biplane of the Company's own design, which is shown in the accompanying illustrations and scale drawings.

As may be seen, this machine possesses several distinctive features, notably the swept-back planes and the "armoured" stream-line nacelle. The latter is mounted on the top of the lower plane, and is built up of ash, covered with sheet steel, which covering is

incorporated whereby dual control for either of the three operations—rudder, elevator and ailerons—may be installed separately or all together by the fastening of four nuts and a bolt. By this means the pupil can become accustomed to the controls one at a time.

Top and bottom planes, which have a span of 36 ft., are made up of three panel sections, the centre section measuring 8 ft. span and the two outer ones being slightly swept back, and thus giving the machine a certain amount of inherent stability. Each surface is built up of two main spars of specially selected ash, and ribs of spruce, the whole framework being braced and covered with Irish linen doped with five coats of aero varnish and three coats of Valspar. Upper and lower surfaces are separated by six pairs of streamlined



Side and front views of the Federal pusher biplane.

given a finish of black enamel with vermilion lines. The cockpit, seating pilot and passenger side by side, is just forward of the planes, giving an excellent view, and the seats are upholstered with "lanasilk" cushions, which are capable of sustaining the weight of two men in water, should a forced descent be made on the latter. Two fuel tanks, each having a capacity of 21 gallons, or sufficient for $4\frac{1}{2}$ hours' flight, are fitted one on either side of the engine—a 100 h.p. Curtiss OX—which is mounted in the rear of the nacelle. Roomy lockers are provided under the seats for tools, spares, &c., so that minor repairs or adjustments may be effected on the spot. The radiator is mounted on the top of the nacelle just in front of the engine. It is proposed to instal in future models a new engine with which the Federal Co. have been carrying out extensive tests. The Curtiss shoulder-yoke type of control is fitted, in which an ingenious arrangement is

mahogany struts, the fittings of which—as with all other fittings throughout the machine—being of sheet steel stamped out in one piece. Roebling steel cable is used for the bracing throughout, and quick-release connections are used extensively. Ailerons are hinged to the outer extremities of the rear spars of both top and bottom planes.

The outriggers carrying the tail are of 1-inch steel tube filled with spruce, the spacing struts being of oval section steel tubing secured to the outriggers by stamped steel clips. The tail planes consist of a non-lifting stabilising surface of about 30 sq. ft., to the trailing edge of which are hinged two elevator flaps of 15 sq. ft. each, and a large rudder hinged to a triangular vertical fin. The landing chassis is of the Farman-Wright type, with a pair of 26 by 4 in. wheels to each skid. It is strongly braced by steel tubing.

The Remains of "L. 21."

DURING next week the general public will have an opportunity of viewing the most interesting of the remains which were rescued from the wreck of the "L. 21," together with a Fokker monoplane. It was found impossible to arrange for the exhibition at the Guildhall, the Mansion House or the Royal Exchange, but by the generosity of the Lord Mayor, Sir Charles Cheers Wakefield, who is defraying all expenses, it is to be held in the grounds of the Honourable Artillery Company in Bunhill Row. The Lord Mayor will open the exhibition on Monday, and it will be open to the public on the following days from 8 a.m. to 8 p.m.

There will be no charge for admission, but collecting boxes will be placed in the tent for the City of London branch of

the British Red Cross Society and the Kitchener Memorial Fund.

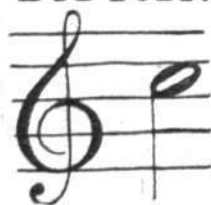
Airships and the Duty of the Public.

A FRESH order issued by Major-General Sir Francis Lloyd, the military authority for the London District, directs that all wreckage of airships, bombs, &c., shall be reported immediately to the nearest military or police authorities.

Sir Francis says "it is a matter of great importance to the naval and military services that they should always be placed in possession of all available information concerning the enemy's aircraft and the projectiles which are employed."

A warning is given that unexploded bombs should not be touched.

DISTANT CONTROL OF AIRCRAFT BY WHISTLING.



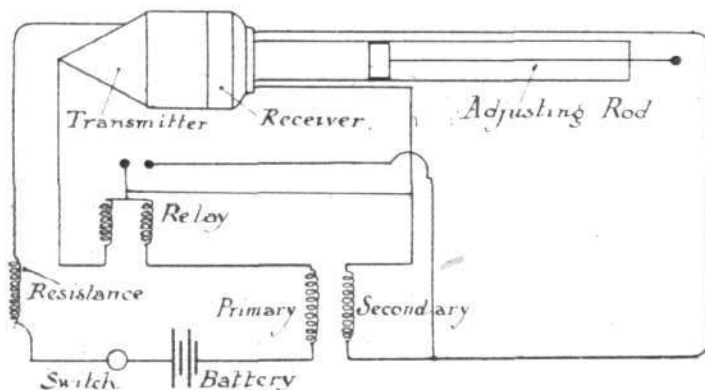
THE note is no sooner sounded than its resonant echo becomes audible and is followed immediately by the faint whirring of two little electric motors mounted in the nose of the framework of the model airship.

Again the note is sounded and the motor on the left stops, while that on the right continues to revolve. Once more that mysterious note, gentle as the tuning of a stringed instrument on which the sordino has already been placed, and the right-hand motor ceases its whirl while that on the left takes up the work. Soft as it is, the note when again sounded stops both front motors and starts a third motor, having its propeller axis vertical for ascending and descending. Simultaneously a small weight, representing a bomb, is released by means of a trap door and falls clattering to the floor of the room in which we are witnessing the demonstration. A last note, and all the machinery comes to a standstill and everything is quiet. We look up and meet several pairs of eyes in which are mingled surprise and incredulity, strangely reflecting our own feelings. The only pair of eyes in that room which do not indicate the same frame of mind are those of the inventor, who calmly approaches us with a slightly amused look on his face and proceeds to explain "how it is done."

Mr. Alban J. Roberts, of Sydney, might very well be termed the Edison of Australia. Still a young man, he has been engaged for a number of years on electrical engineering in all its branches, notably on the principles of telegraphy and telephony, wireless and otherwise. He has experimented in Australia, India and America, as well as in this country, where he sent out wireless messages as long ago as in 1908 from a balloon. He still owns a small dirigible airship, stationed out in Australia, on which he goes for an occasional cruise when his travels take him to that part of the globe. Some years ago, it may be remem-

of the latter term under present conditions is, of course, "enemies." Before proceeding to indicate the nature of Mr. Roberts's latest invention, it may be well to point out that distant control of aircraft is only one out of a great number of applications of which the instrument is capable. In fact, using it for this particular purpose is, perhaps, in the inventor's mind merely a minor "side line," fraught with possibilities as it would appear to be.

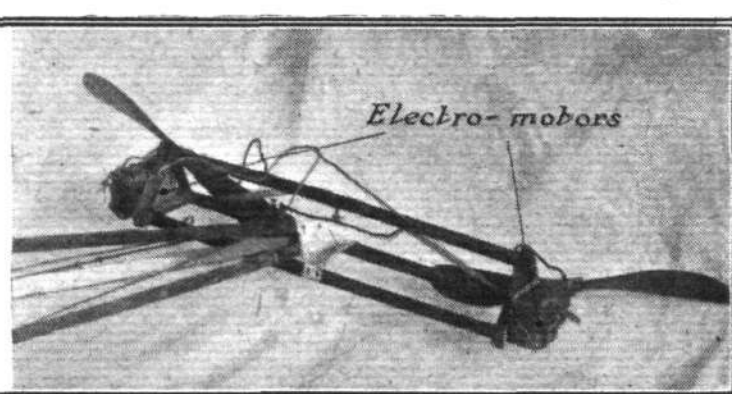
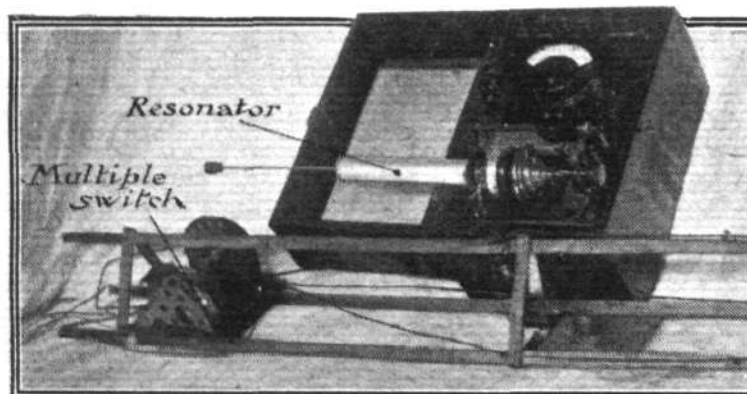
Briefly speaking, Mr. Roberts makes use, in his device, of the well-known principle of resonance, which will be familiar to most of our readers. Those



Wiring diagram of the Roberts resonator as applied to the control of aircraft.

not already acquainted with it may demonstrate it by the very simple experiment of pressing down the "loud" pedal of a piano and playing a note on some other instrument—a violin, for instance. The corresponding note will then sound on the piano.

The Roberts resonator consists fundamentally of a telephone transmitter and receiver, facing one another and placed a short distance apart, the space between them being enclosed in a cylindrical casing which confines the air, thus amplifying the reaction between



Framework of the model airship on which the Roberts resonator was demonstrated. The third motor, driving a propeller with its axis vertical, is not shown in the illustration.

bered, Mr. Roberts had a small model airship, controlled by wireless, which he demonstrated at the "Halls."

Since then he has developed a new method of distant control, which is, he considers, a great improvement on the wireless method, since it may be so arranged as to absolutely prevent interference by "unauthorised persons." The natural interpretation

transmitter and receiver. To the back of the receiver is attached a tube in which works a piston operated by a short rod. By moving the piston in and out the length of the air column behind the receiver is changed, and consequently the note emitted when the diaphragms of transmitter and receiver are vibrated is altered correspondingly. The principle of the whole arrangement will be better and more easily understood

by reference to the accompanying diagram. The telephone transmitter is coupled to the primary current and the receiver to the secondary current. From one of the terminals of the transmitter a wire runs through a suitable resistance, to a switch, hence through a battery, through the primary circuit of an induction coil, to an ordinary post office relay, and from there back to the second terminal of the transmitter. The wiring from the receiver is, it will be seen, connected up to the secondary circuit of the induction coil. When the armature of the relay moves over it provides short circuiting by the two wires shown in the diagram running to each side of the secondary coil.

It will now be seen that when the diaphragms of the transmitter and receiver are vibrated by the proper note, determined by the position of the piston in the tube, and no other note will cause them to vibrate, the relay is brought into play and closes the local current which may then be used, *via* suitable means, of course, for starting or stopping an engine, operating control surfaces, releasing bombs, &c.

In the model framework of a dirigible on which the principle of distant control was demonstrated, there were, as we have already indicated, three small electromotors, each driving a propeller. As demonstrated the sequence of operation of the three motors was, in fact, predetermined by reason of the multiple switch employed for throwing them into gear, the same note being used for initiating the control of all the motors. When rigged up for actual use on aircraft each motor and movement would have its particular note, so that no fixed sequence would have to be followed. Thus, for instance, one note would correspond to right rudder, one to left rudder; one to elevating, one to depressing; one to accelerating the engine, and one to throttling it down. In this way any evolution of an aircraft could be controlled from the ground, the necessary notes being produced by some suitable instrument, as, for instance, a siren, in which the note could be altered by varying the speed

of the siren. Care would, of course, have to be taken that no note likely to be produced on board the aircraft itself, either by the engines or by the bracing wires humming in the current of air, was employed for control. In fact, there seems to be no reason why notes of such a pitch as to be inaudible to the human ear should not be employed.

On the model demonstrated to us it was possible to set the machinery in motion by running up and down the scale until the right note was found. The inventor claims, however, that it would be a very simple matter to arrange a combination whereby it would be necessary to sound the given note, not once but several times, with predetermined intervals, before the result was obtained, thus providing in effect an equivalent to the combinations used on safes, and absolutely preventing outside interference. It is mainly in this respect, we understand, that Mr. Roberts claims superiority of the resonance method over the wireless system, in which latter a coherer must be used, and which is therefore open to the criticism that it may comparatively easily be interfered with.

As regards the practical utility of this very ingenious device to aircraft work, the number of forms this might take appear to be legion, and although many difficulties suggest themselves, doubtless they can be overcome. Even if they cannot, that does not detract in the least from the ingeniousness of the device. The inventor has, as already mentioned, ample scope for the application of the device to other fields of engineering. Thus, for instance, for telegraphic purposes the resonator renders possible the sending of a great number of telegrams over one wire simultaneously, with the further advantage that "tapping" the wire can be made practically impossible. Communication can be maintained between a central station and each of a number of trains, thus minimising the danger of collision, and there are numerous other applications possible, which we cannot deal with here.

THE FLYING SERVICES FUND—Administered by THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The Fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers, and men.

Forms of application for assistance can be obtained

from the Royal Aero Club, 166, Piccadilly, London, W.

Subscriptions.		£	s.	d.	
Total subscriptions received to Sept. 12th, 1916		10,839	7	4	
A. R. Weekes			0	10	0
Collected at the Westland Aircraft Works, Yeovil (Forty-eighth contribution)			1	2	4

Total, September 19th, 1916 .. 10,840 19 8
166, Piccadilly, W. B. STEVENSON, Assistant Secretary.

Fatal Accidents.

At an inquest on September 13th relative to the fatal accident, on the previous day, to Captain Olive H. Ormrod, R.F.C., it was stated that the machine rose with one wing down, presumably through insufficient flying speed, and at a height of 40 ft. the machine side-slipped and made a nose-dive to the ground, Captain Ormrod's skull being fractured. A verdict of "Accidental Death" was returned.

An inquest was held at Aldershot on September 14th on Geoffrey L. Railton, a pilot at the R.A.F., and Frederick Williams, draughtsman, who were killed on September 12th. Something was seen to go wrong with the right wing, the machine spiralled and then corkscrewed to the ground. Evidence was given that the machine had flown 36 hours previously and was then all right. It was thought that the

accident was due to the failure of a steel fitting supporting the outer end of the top right hand wing. There was a flaw which could not be detected from the outside. A verdict of "Accidental Death" was returned.

A verdict of "Accidental Death" was returned by a Birmingham jury at an inquest on September 18th on Flying Officer and Inspector John Hodges and Second Lieutenant Leslie Fyson. Evidence showed that the two officers went up in a biplane which was completely overhauled before the start. It was in a perfect condition for flying purposes. The machine was seen to "loop the loop" at a height of about 3,000 ft., and although it seemed to go through the evolutions all right at first, a movement of the tail plane was noticed. The machine then appeared to collapse and fell to the ground.



HAVE you ever heard the tale of the old iron pot? No. You mustn't say "No," and you mustn't say you "Don't know," and you mustn't say you "Don't remember." In fact, you mustn't say anything. It's simply the tale of the old iron pot, and there is no getting away from it.

Now, with regard to getting away from it, there is something that whacks the old iron pot into tiny fragments.

Are you in possession of any invention, or process or method of manufacture, or any article manufactured or proposed to be manufactured? If so, you are in a bad way, for you must to the authorities furnish drawings, models, plans, and explain and demonstrate the same to such person appointed, in all or any of its uses and workings. "And if any person fails or neglects to comply . . ." Well, may your Patron Saint help you.

Have you any document, note, photograph, sketch, plan, design, model, pattern, specimen, and all the rest of the words in the dictionary? Then you have piled up for yourself a lot of trouble.

For a solution to all this pother you should turn to a special supplement to the *London Gazette* which has been issued, containing additions to the regulations under the Defence of the Realm Act, where you will find it set out under Clauses (a), (b), (c), (d), and with an introduction as follows:—

"If any person having in his possession or under his control any document, note, photograph, sketch, plan, design, model, pattern, specimen or article (including any key or other article affording means of access to information) of such a nature as is calculated to be, or might be, directly or indirectly useful to the enemy . . ."

That sounds drastic enough, doesn't it? Almost terrible enough to make one think of destroying any incriminating evidence. But, steady! You must do none of that. Here is Clause (a), which follows the drastic introduction above:—" . . . without lawful authority destroys, makes away with, or allows any person to inspect or to be in possession of such document, note, photograph, sketch, plan, design, model, pattern, specimen, or article as aforesaid; or . . ."

Oh, dear no! You can't get rid of it by the simple process of losing it like a yellow dog. You're up against Clause (b) then, which says:—" . . . loses, fails to take reasonable care of, or so conducts himself as to endanger the safe custody of, such document, note, photograph, sketch" (and most of the other words in the dictionary) "or article as aforesaid; or . . ."

What, you will have to keep it then? Well, I'm afraid you will get into trouble if you do, because Clause (c) says:—" . . . retains such document,

note, photograph" (and all I have chronicled before), "or articles as aforesaid in his possession or control when he has no right to retain it, or when it is contrary to his duty to retain it; or . . ." And so to Clause (d):—" . . . fails to comply with any directions issued by lawful authority with regard to the custody, production, or the return of such document, note, photograph, sketch," and all the rest of it, and a bit more if possible, "or article as aforesaid; he shall be guilty of an offence against these regulations, and if any person without lawful authority or excuse, has in his possession or under his control any document, note," &c., &c., &c., and so forth and so on, "or article as aforesaid, he shall be guilty of an offence against these regulations."

Now you will thoroughly understand it, and see that if you have any documents, notes, photographs, sketches, &c., &c. (try another dictionary), in your possession, you'll have to turn them all out. There's going to be a sort of kit inspection on a magnificent scale.

You will notice it says:—" . . . of such a nature as is calculated to be, or might be, directly or indirectly useful to the enemy."

That reaches a long way; a very long way. In fact, I am not quite sure how far it does reach. There are those old photographs, sketches, &c., &c., that you took on the east coast four years ago when on your holidays. What are you going to do about it? They certainly might be of use directly or indirectly to the enemy.

All those sketches, plans, drawings, blue-prints, designs, calculations, &c., &c., of the 'bus you are building, or going to build, or thinking of building, or might build. Out they will all have to come to the broad light of day. There is no bilking it.

The fiat hath gone forth in the quoted words as above, and there is going to be trouble in the camps, for nobody can tell for certain just what it embraces; as a fact, it appears on the surface to embrace everything, *Ab ovo usque ad mala*.

As I have said, this business is very far-reaching. From the cephalic region, reach tentacles penetrating into the utmost cavities of private and public life. Read this again:—" . . . of such a nature as is calculated to be, or might be, directly or indirectly of use to the enemy." I do not suppose it is intended that it shall be so all-embracing as appears, but that it could be, the order of the phrasing leaves no shadow of a doubt.

Reading it *en bloc*, it would appear that the authorities are desirous of having the benefit of any invention emanating from the brain of the private individual; past experience points a rather steady finger to fact in that inventors and their inventions have received scant encouragement to lay the result of their working before those able to use all good

things for the national welfare. As an ideal, it is, of course, ideal. It is right and patriotic that Government should have first call upon anything of use from the service point of view; but it appears to me that organisation necessary to the bringing of the idea into measurable distance of being smoothly workable is of such colossal proportions as to be seemingly impossible.

Who is to decide whether a thing is calculated to be directly or indirectly of use to the enemy? Those in authority, of course. This, governed by the clause making it an offence not to disclose all plans, sketches, photographs, &c., &c., means that the Department (a new one, I presume) will be simply inundated with inventors arriving in thousands to exhibit their brain-waves, good, bad and indifferent.

There must be hundreds of thousands of men in this country at the moment who have plans, drawings, designs, photographs, &c., in their possession, sufficient, if they lay them before the board, to keep the members of that judicial department going for the rest of their lives. For how is one to decide what is, and what is not, calculated by the official mind to be directly or indirectly of use to the enemy?

It is comparatively easy to make laws, but oftentimes vast machinery has got to be evolved in order that those laws shall be enforced. It is an offence for a man to break into another man's house and remove his goods and chattels. Yet it takes whole armies of policemen, judges, magistrates and what not, with vast organisations throughout the entire world, to enforce observance.



THE ROLL OF HONOUR.

THE Secretary of the Admiralty announces the following casualties:—

Accidentally Injured.

Flight-Suo-Lieut. G. S. Gray, R.N.
Flight-Sub-Lieut. L. Edwards, R.N.

The following casualties have been officially announced by the War Office:—

Killed.

Lieut. A. J. Bowerman, Somerset L.I., attd. R.F.C.
Second Lieut. G. N. Cousans, R. Innis. Fus., attd. R.F.C.
Second Lieut. A. E. Glen, R.F.C.
Lieut. H. S. Mackay, R.G.A. and R.F.C.
18049 2nd Air-Mechanic E. Emmett, R.F.C.

Died of Wounds.

Second Lieut. L. D. Russell, R.F.C.
10776 2nd Air-Mechanic C. C. D. Playle, R.F.C.
3538 1st Air Mechanic H. P. Warminger, R.F.C.

Died.

17530 2nd Air-Mechanic D. Menzies, R.F.C.

Wounded.

Lieut. E. Ambler, W. Yorks Regt., attd. R.F.C.
Second Lieut. W. H. C. Buntine, Sher. For. and R.F.C.
Second Lieut. C. J. Campbell, R.F.C.
Second Lieut. C. R. Cook, R.F.C.
Second Lieut. D. H. Dabbs, Yeomanry and R.F.C.
Lieut. E. D. Hicks, General List and R.F.C.
Second Lieut. F. H. Hodgson, R.F.C.
Second Lieut. F. D. Holder, Buffs (E. Kent) and R.F.C.
Second Lieut. H. A. Howell, R.F.C.
Capt. G. G. A. Williams, Dragoon Guards, attd. R.F.C.
8447 2nd Air-Mechanic J. E. Allan, R.G.A., attd. R.F.C.
25546 2nd Air-Mechanic E. R. Brotherton, R.F.C.
5708 2nd Air-Mechanic E. C. Skinner, R.F.C.

Previously unofficially reported Killed, now reported Wounded and Prisoner of War in German hands.

Second Lieut. C. J. Sandys-Thomas, R.F.C.

Previously reported Missing, now reported Wounded and Prisoners of War.

Second Lieut. S. H. Ellis, R.F.C.
Second Lieut. L. N. Graham, W. Yorks Regt., attd. R.F.C.

Previously reported Prisoner of War, now reported Wounded and Prisoner of War in German hands.

Lieut. W. O. T. Tudor-Hart, North'd Fus. and R.F.C.

Missing.

Lieut. E. G. A. Bowen, R.G.A., attd. R.F.C.
Lieut. E. Bainbridge, R.F.C.
Second Lieut. E. C. Kemp, Yorks Regt., attd. R.F.C.
Lieut. N. P. Manfield, Northampton Regt. and R.F.C.
Lieut. R. M. Stalker, Seaf. Highrs. and R.F.C.
Second Lieut. J. C. Taylor, K.O. Scot. Bord., attd. R.F.C.
Second Lieut. C. L. S. Thomas, Border Regt., attd. R.F.C.

Previously Unofficially, now Officially, reported Prisoner of War in German hands.

Capt. T. W. P. L. Chaloner, Yorks Regt. and R.F.C.

Previously reported Missing, now reported Prisoners of War in German Hands.

Lieut. M. R. Chidson, R.G.A., attd. R.F.C.
Second Lieut. C. D. Griffiths, R. Welsh Fus. and R.F.C.
Second Lieut. D. S. C. Macaskie, R.F.C.

Previously reported Missing, now reported Prisoner of War.

2458 Corpl. R. G. Johnstone, R.F.C.

Correction:

Previously reported Missing, now reported Prisoner of War.

Capt. J. H. F. McEwen, Cameronians (Scot. Rif.), attd. R.F.C., should read:
Capt. J. H. F. McEwen, Cameron Highrs., attd. R.F.C.



Echoes of the Jutland Battle.

In a supplement to the *London Gazette* published on September 15th were published despatches from Admiral Sir John Jellicoe, giving list of recommendations for honours, promotion, &c., in connection with the Battle of Jutland.

In the list of officers recommended by Vice-Admiral Sir David Beatty for honours is the following:—

Lieutenant FREDERICK JOSEPH RUTLAND, R.N. (Flight-Lieutenant, R.N.A.S.).

For his gallantry and persistence in flying within close range of four enemy light cruisers, in order to enable accurate information to be obtained and transmitted concerning them. Conditions at the time made low flying necessary.

The King has been graciously pleased to give orders for the award of the Distinguished Service Cross to the under-mentioned officer in recognition of his services as mentioned in the foregoing despatch:—

Flight-Lieutenant F. J. RUTLAND, R.N. (Lieutenant, R.N.).

Among those recommended by Sir John Jellicoe for pro-

motion from Lieutenant-Commander to Commander appears the following:—

CHARLES GWILLIM ROBINSON.

In command of "Engadine." Was prompt in sending up a seaplane to scout. Handled his ship in a skilful and seamanlike manner, and towed "Warrior" for 75 miles, subsequently succeeding in taking off her crew, thus saving their lives.

Legion of Honour for R.N.A.S. Officer.

In the *London Gazette* of September 15th it was announced that the President of the French Republic has bestowed the decoration of the Legion of Honour, with the approval of His Majesty the King, on the undermentioned officer, in recognition of his services during the war:—

Lieutenant LANCELOT TOMKINSON, R.N. (Flight-Commander).

A Military Medal for the R.F.C.

In the long list of awards of the Military Medal notified in the *London Gazette* of September 14th:—

5800 Corporal (Acting Sergeant) J. H. WALLER, R.F.C.

ANSWERS TO CORRESPONDENTS.

If in doubt about anything aviatric, write to "FLIGHT" about it.
J. J. M. (Byfleet).

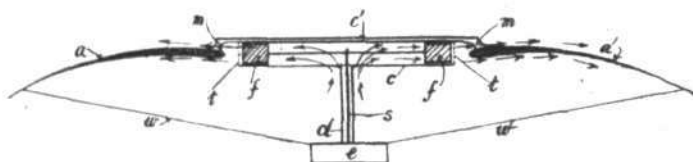
The lift (K_y) and drag (K_x) coefficients of the Kauffman section published on p. 604 of our issue of July 20th, are converted into "absolute" coefficients by division by .0051. Thus, for instance, the lift coefficient at 10 degrees incidence is given as .0026; $.0026 \div .0051 = 0.51$ approximately, which is therefore the absolute lift coefficient at 10 degrees incidence. You will have noticed that in the N.P.L. reports, in order to obtain the lift in lbs. square feet, it is necessary to multiply the absolute coefficients by $.0051V^2$, where V = the speed of the machine in miles per hour. In our graph we had already multiplied the absolute coefficients by .0051, so that in order to obtain from the graph the lift in lbs. per square foot it is only necessary to multiply the coefficients given by V^2 , where V = the velocity in miles per hour.

R. M. H. (Erith).

By "warp control" is meant a twisting of part or the whole of an aeroplane wing, so as to increase the angle of incidence towards the tip, thereby increasing the lift. In most modern machines wing warping is no longer employed, as it tends to cause fatigue in the material of which the wing is constructed. Ailerons or balancing flaps hinged to the outer portion of the rear spars are used instead. The effect of an aileron is to increase the camber of that portion of the wing. The reason for gearing down a propeller is that a slow-running propeller of large diameter is more efficient than a fast-running one of smaller diameter, or, in other words, generally speaking, less power is required to impart a small velocity to a large mass of air than to give a high velocity to a small mass of air. The difference between propeller and tractor air screws was explained in our column on p. 717 of our issue of August 24th. The vertical attitude of a Zepp. when climbing is more apparent than real. These airships do, of course, point their nose upwards when climbing rapidly, in order to obtain lift from their screws, but we doubt very much whether they ever approach the vertical. What causes them to appear vertical is probably the perspective in certain attitudes combined with the climbing angle.

"AEROSTAT" (West Kensington) writes:—

"In view of the development of large goods-carrying aeroplanes or airships without aerostats, and of the disadvantages of dirigibles for such work, the opinion of any correspondents as to the practical nature of the idea would be very welcome.



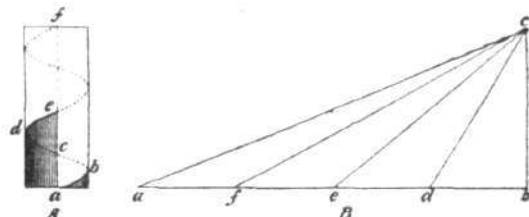
In the sketch, which shows merely a general scheme, a centrifugal fan, f , rotates in a cage, c , of which the top is closed by a disc, c' , supported by struts, t , and having arms, m . These arms support an annular cambered plane, aa' , arranged as an inverted saucer surrounding the fan. An engine platform, e , carries a shaft casing, d , which encloses the fan-driving shaft s . Tension wires, w , are provided. Air currents are drawn in beneath the fan cages, and are directed by the fan (as shown by the arrows) against the annular plane. The plane is thus acted on by a relative wind precisely as is the wing of an ordinary aeroplane, and both top and bottom surfaces contribute to the 'lift.' An airship without wings, but having

such a lifting plane at bow and stern, and with a propeller to supply lateral motion, would certainly resemble the airship of fiction."

We doubt very much whether such an arrangement as you suggest would meet with any success. To drive a centrifugal fan which would deal with the necessary amount of air and impart to it sufficient velocity to impart any lift to the annular cambered plane, would probably require a good deal more power than that necessary in the ordinary direct lift machine. Also some vertical surface would have to be provided to counteract the torque of the fan, as otherwise the whole machine would spin round its vertical axis.

F. W. (Monmouthshire).

Perhaps the easiest way to understand the principle of a true screw is to imagine an inclined plane wrapped around a cylinder, as shown in A, where the shaded portion represents the inclined plane, making one complete turn round the cylinder. The inclined edge of the plane forms the helix $abcde$. If the inclined plane were laid out flat as shown in B, the base line ab would represent the circumference of the cylinder, and the perpendicular line bc would represent the pitch of the helix. The line ab may therefore be taken as the circumference of the circle described by a point at the tip of the blades, while bc is the distance advanced along the axis in one revolution. The angle cab is the helix angle at the tip. If bd , be and bf are set off from b along ab so that they represent the circumferences of circles described by points situated one-fourth, one-half and three-fourths of the length of the propeller blade, and are joined up to the point c , the resulting angles will be the helix angles at these points. It is usual practice to increase the chord angles of the propeller blade at the various points by from 2 to 5 degrees, these angles being termed the angles of attack, and corresponding to the angle of incidence of an aeroplane wing. It will thus be seen



that if the chord lines be produced they will not meet the vertical line in the point c , but at a point higher up, how much higher will depend on the magnitude of the angles of attack. It should be pointed out that the chord angles need not always be greater than the helix angles, but this is a point on which we cannot touch here.

To take a numerical example: Let us suppose that we wish to design a propeller for a machine to fly at 72 m.p.h., or 100 ft./sec. The maximum permissible diameter we shall take as 8 ft.—the diameter is usually decided by constructional considerations, such as keeping down the height of the undercarriage. The propeller is to run at 1,200 r.p.m., or 20 r.p.sec. The pitch is therefore $100 \div 20 = 5$ ft. The circumference of the circle described by a point at the tip of the blade is $= \pi \times \text{diam.} = 3.1416 \times 8 = 25.13$ ft. We therefore mark off the base line to some suitable scale to represent a length of 25.13 ft., and mark off the vertical or pitch line to represent 5 ft. We can now mark off any points desired at any desired distance from the foot of the vertical line, and by connecting these points to the top of the vertical line the corresponding helix angles are found.



Another Famous German Pilot Killed.

THE *Vossische Zeitung* reports that Lieut. Fahlbusch, who was mentioned in the Berlin *communiqué* of September 4th as having "greatly distinguished himself in recent successes," has been killed in action.

The Bill Raid on Brussels.

CONSIDERABLE enthusiasm appears to have been aroused among the Belgian population of Brussels by the appearance of an Allied aeroplane distributing parcels of bills last week. Although it was heavily bombarded, the machine got away safely after dropping some bombs on the Zeppelin sheds and severely damaging them. By way of venting their chagrin the Germans accused the inhabitants of making light signals

to the airman, and as a punishment ordered that everyone must be indoors before 7 p.m.

Instruction in Petrol Motors, &c.

EVENING classes for instruction in the care and repair of petrol motors commence at the Borough Polytechnic, Borough Road, S.E., on September 25th, and those who wish to take advantage of the course should enrol at once. Apart from the lectures on Mondays, there is practical work on Wednesday and Thursday evenings as well as classes for drawing and calculations. The fee for the course is 30s.; and the instructors are Mr. A. Marsden, M.I.A.E., A.M.I.M.E., and Mr. W. Hill, A.M.I.A.E. There is also a course in motor car engineering, which commences on September 27th.



Grahame-White School, Hendon.

STRAIGHTS with instructors last week: Messrs. Kaizer, Lord, Green, Payne, Rogers, Steeves, Sutherland and Travers. Circuits with instructors last week: Messrs. Culver, Edwards, Hodgkinson, Meering, Saunders, Styles and Zambournis. Brevets during week: Messrs. Lyles and Mills.

Instructors: Messrs. Manton, Winter, Pashley and Biard.

Hall School, Hendon.

PUPILS out last week:—With Cecil M. Hill: Lieut. Malden. Messrs. Cowell, Dutton and Rand (extra practice). With Fred J. Glegg: Messrs. Smith, Henley, Barton, Mayer, Bate-man and Lieut. Packman. With Gerald Smith: Messrs. D. A. Stamps and L. F. Barton. With Stanley G. Cownie: Messrs. Blake, Pugh, Foster, Course, Heathcote and Yuill.

Royal Aero Club certificate taken by Mr. D. A. Stamps in excellent style.

Hall (Government-type) tractors in use.

London and Provincial School, Hendon.

ROYAL AERO CLUB certificates were taken this week by Messrs. W. R. Jones and G. A. Quayle.

Instructors: Messrs. W. T. Warren, M. G. Smiles, P. G. Allen and W. T. Warren, Jun.

Five machines in use.

Bournemouth School.

PUPILS rolling alone last week: Messrs. Ross, Burry and Allen. Doing straights alone: Messrs. Brandon, Montgomery, Holland, Davies and J. B. Smith. Half circuits alone: Messrs. Constant and Montgomery. Eights and circuits alone: Messrs. R. G. Hammersley, R. P. Fenn, H. Smith, W. A. Pritt, J. Adamson, C. S. Hinchliff and W. H. Wilmot.

Instructors: Messrs. S. Summerfield and E. Brynildsen.

Certificates were taken during the week by Messrs. R. G. Hammersley, R. P. Fenn, H. Smith, W. A. Pritt, J. Adamson, C. S. Hinchliff and W. H. Wilmot.

FLYING AT HENDON.

THERE was a much better attendance at Hendon Aerodrome last Saturday afternoon, and plenty of flying was to be seen. Messrs. Marcus D. Manton, J. S. B. Winter, C. Pashley, B. F. Hale and H. C. Biard were busy all the afternoon taking up passengers on the 80 h.p. Grahame-White three-seater biplane. Pashley on one occasion ascended with two khaki passengers to an altitude of about 600 or 700 ft., from which he descended with a series of graceful right- and left-hand spirals. Manton also put up a very fine show on a de Havilland pusher scout, which must have been a change, indeed, after coming fresh from a "box-kite." We had a very welcome aerial visitor in Flight-Lieut. F. Warren Merriam, who came over from Chingford with a pupil passenger on a Grahame-White biplane. His descent into the aerodrome was quite spectacular, for, cutting off his engine at a great height, he "floated" down very slowly, at times hovering almost motionless and then swooping in wide spirals. M. G. Smiles put up some more looping on the L. and P. tractor. He also flew over to Golders Green and gave a fine demonstration above a "Charity Show." The writer had the pleasure of accompanying Smiles on this trip as passenger, and it must be admitted that, inspiring at it is, the looping of the machine when viewed from

the ground is nothing compared to the "looping" of the ground when viewed from the machine. Starting off at about 4.30, we circled around until well up above the appointed spot—the circular, white marquees, and ant-like merry-makers being plainly visible. After an overture of banked turns, "eights," &c., we began a series of 14 consecutive loops, the little white marquees appearing over the top plane during each loop with the regularity of clockwork, but getting bigger and bigger each time. At the top of the fourteenth loop the engine, which had been going all out the whole time, faltered somewhat, so it was given a chance to get its breath back again before further loops were attempted. A few more loops brought us within a few hundred feet of the ground, so we made tracks for the 'drome, Smiles giving one final, joyful loop, as we entered it. Other machines out during the afternoon were several B.E. 2—some letters of the alphabet—Curtiss tractors, a Maurice Farman—which did vertical banks—a Sopwith 1½-strutter, and a Dyott battleplane. In the evening the various schools got going.

Sunday's proceedings consisted solely of passenger work on the Grahame-White 'bus, rain in the evening putting a stop to further work.

Lord Montagu at Edinburgh.

LORD MONTAGU, in connection with the series of meetings arranged by the Navy League, visited Edinburgh on September 12th and addressed a gathering of business men in the Freemasons' Hall, his subject being "Aircraft Policy."

Speaking of aircraft used for military purposes, Lord Montagu remarked that he did not wish to go back to the somewhat heated and rather exaggerated controversy of six months ago. He preferred to look to the future.

As to what would happen after the war, Lord Montagu remarked that in his opinion peace was somewhat afar off yet—probably a year, probably more. In any reduction we might have to make from the pressure of finance, the aircraft service must be the last to be affected. Since aircraft had become so large and numerous, we were no longer an island. We were liable to invasion. In future, invasion would not be by a score or two of airships and a hundred or two of aeroplanes, but on an infinitely larger scale. We would require to have aircraft all round the coast. At least 1,000 miles of our 2,000 miles of coast would have to be defended. These places of defence could not be more than 20 miles apart. There were frontiers all over the world to defend. There was

a frontier of 1,200 miles on the north-west of India. It could be defended at less cost and with greater certainty in this way than in any other. Aircraft must more and more become the weapon of the nations of Europe, if only because it was the weapon of poverty. You would get more result out of £1,000 spent on aircraft than from any other form. Suppose we had a permanent force in this country of 20,000 aeroplanes. That should not cost more than 15 millions to start with, reckoning at £750 apiece. You would not need more than two officers apiece to work them, and, say, 120,000 other personnel, making about 160,000. Could we say these were beyond what seemed to be the necessities of the case? It was the minimum which we must consider.

A Fokker in East London.

THE most popular of the "side shows" at the National Economy Exhibition which opened at the People's Palace, Mile End Road, on Monday, is the tent housing a Fokker monoplane and some of the guns recently captured on the Western front. The Fokker is similar to that described, with scale drawings, in "FLIGHT" of December 10th, 1915, except that it has a 9-cyl. 100 h.p. German-Gnome engine instead of a 7-cyl. 80 h.p. one.

AIRISMS FROM THE FOUR WINDS.

Design of the silver badge to be worn by men who



have returned from the front to mufti once more.

A RECENT contribution to the Lord Kitchener Memorial Fund is £36 15s. 10d. from the Anti-Aircraft Training Depot, per Lieut.-Col. R. P. Leach.

THE "sporting instinct" of the Boche was well illustrated on the occasion of the recent raid on Ghent. The German soldiers rushed out of the arsenal, closing the gate behind them and preventing Belgian workmen from getting out, so that the latter had to jump through the windows.

H.M. THE KING was very interested in the work of the R.F.C. during his visit to Oxford on September 13th.

THE aeroplane proved very useful to the British Consul at Kavalla in superintending the evacuation of the civil population. He made several trips by way of the air to the Island of Thasos to arrange details.

THE monoplane piloted by Lieut. Warneford when he strafed the Zepp. is now the most popular item in the Red Cross Active Service Exhibition at Liverpool.

BURTON-ON-TRENT is likely to be famous for other things besides ale.

ONE of its claims is that it is the centre of England. There are those who have the idea of making it the centre of the British aircraft industry.

TESTING tractors on the Trent. Sounds attractive, doesn't it?

No doubt Ernest Ridgewell, who was fined £3 at Brentwood, Essex, for not immediately extinguishing a light when ordered to, on the night of the air raid, wishes he had not told the special constable that he must wait.

WITH the enormous extensions of the shops in aircraft factories, it frequently becomes a matter of some difficulty to quickly locate any particular man wanted quickly. Mr. Sigrist, works manager of the Sopwith Aviation Co., has thought out a very neat scheme whereby any shop foreman, manager, or other head of a department may be instantly summoned from any part of the extensive works where he may happen to be at the moment. Suspended from the ceiling in a central and conspicuous position are a series of electric bulbs of different colours, each head of a department having his own colour. Each of the bulbs is connected up to a switchboard conveniently placed, and if, for instance, Mr. Sigrist is wanted, a blue light is switched on. If by any chance he himself does not happen to see the light at once, someone is sure to do so and report that the particular light is on.

THERE can be no question of the efficacy of this system, which we had an opportunity of testing recently. Although in the execution of his duties as works manager, Mr. Sigrist is literally "all over the shop," it only took us a matter of a minute or so to find him.

RESULT, a lot of time and temper is saved. Other firms please copy.

ALTHOUGH serving very well in its time, the little office in which the secretary of the Wells Aviation Co. laid the foundation for the important organisation since built up is no longer sufficient or in keeping with the size of the firm. Quick to realise this, as other demands of the times, there has now been established large and excellently appointed offices with a main entrance in Whitehead's Grove, adjoining the works, or some of them at any rate, for it is now almost

impossible to walk through one of the streets in this part of town without coming across a shop in which Wells workmen are hard at it.

THE premises for the new offices are two large three-storey houses knocked into one, and arranged in modern fashion with general offices, private offices, drawing offices, filing rooms, &c. Everywhere the furnishing and decorations are in excellent taste, simple and restful to the eyes. The hand of the artist is noticeable throughout. This is hardly, of course, surprising when it is remembered that both Mr. Wells and his indefatigable secretary, Mr. Doyle Jones, were sculptors of no mean ability before turning their attention to aeroplane construction.

WE hope that the old laurel wreath with the inscription, "In loving memory of the Col'drum Pottery," will be transferred to the new premises, where it would recall for all time the old shop in which the foundation of the present successful factory was laid.

FLYING LIFEBOATS are now in use at Atlantic City, and one has already effected a rescue. A bather drifted a quarter of a mile out to sea on an inflated tyre. The captain of the beach control sighted him, and started off in Beryl Kendrick's flying boat. The bather was soon picked up and brought ashore, where he received medical attention. Two flying boats, owned respectively by Kenneth Jacquith and Kendrick, are now as a result officially a part of the life-saving equipment of this district.

WHAT is the joke about the black flag hoisted on the judge's box at Hendon?



"One of Ours," who is hard at it at the Front.—Mr. Roderic Hill, whose delightful pictures are familiar to readers of "FLIGHT," and who philosophically writes that he "supposes 'Archie' is one of the world's necessary evils."

SOME of the pupils there say they can't see it!

AND how about colour-blindness?

LORD MONTAGU of Beaulieu is shortly passing temporarily out of the "realms of the air," so far as the advocacy of its future is concerned. He is likely in the next few weeks to return to India to carry out duties there. In all probability he will not, however, be unassociated with airism. We wish him good health and success in the King's service, and we shall look to his re-opening—if it be then still necessary—his campaign for the vast expansion of the air services to one of Imperial magnitude.

"HUNZOLLERN" is a very happily coined designation, hailing from America, of the Prussian barbarian.

MR. HANDLEY PAGE is to be reckoned amongst the earliest subjugators of the air. He has always been original and well ahead in most things that matter in aviation up-to-dateness. Therefore we gladly give space to his forethought in having long since erected and had running a wind tunnel, by means of which a good deal of research work has been carried out. In fact, as he very modestly puts it, in reference to an airism last week giving the initiative in this respect to the Curtiss Co.: "I think that we can safely challenge other private firms as to priority in this respect."

MODESTY is ever an asset to be encouraged in these days of "push." No thought of self enters the mind of our Service pilots when on the track of the Hun. Just strafing him for the public weal is the only thing that matters with one and every one of them. Therefore it is in refreshing contrast to all the lavish columns of almost nauseating praise which has been spread over the successful Zepp. attack of Flight-Lieut. Robinson to record the straffer's own views upon the incident. Thus spoke Lieut. Robinson, V.C., on Thursday last at the Baltic, when he formally "lifted" one of the little cheques which were waiting for the first pilot to bag a Zepp. over British soil:—

"The thing that I had the good fortune to do, of bringing down a Zeppelin, is a thing which anybody in the Corps, you all know perfectly well, would have done exactly the same if they had the same good fortune that I had."

"I was not the only one to go up after that Zeppelin. You must know that in the case of every Zeppelin that has been over England or near England there have been many airmen who have gone up, and in far worse conditions than I had, I think, that night—men who have gone up in conditions that meant almost certain death."

"Many of them have met their death in chasing these inhuman murderers who have come over here."

"Men, friends of mine, have been maimed for life by going up just on the off-chance of 'strafing' them on absolutely impossible nights, nights when it has been exceedingly difficult to land, misty nights, nights when you can't see the ground—you get up into the mists and can see nothing of

earth. All these deeds I consider a hundred times more heroic than the thing I did."

"It was, I must impress upon you all, merely good fortune on my part. I feel a lot of honour and glory have already been given me, and I feel almost, I would not say criminal; I can't quite express my feelings on the subject, but I know I don't deserve all this kindness—all that you dear people have shown me."

"I just want to thank you, and am sorry English is such a poor language. If I could express myself as I could wish I should say a good bit more, but I simply cannot."

THAT'S the sort of spirit in which to look at these episodes in the world's war.

TEN YEARS AGO.

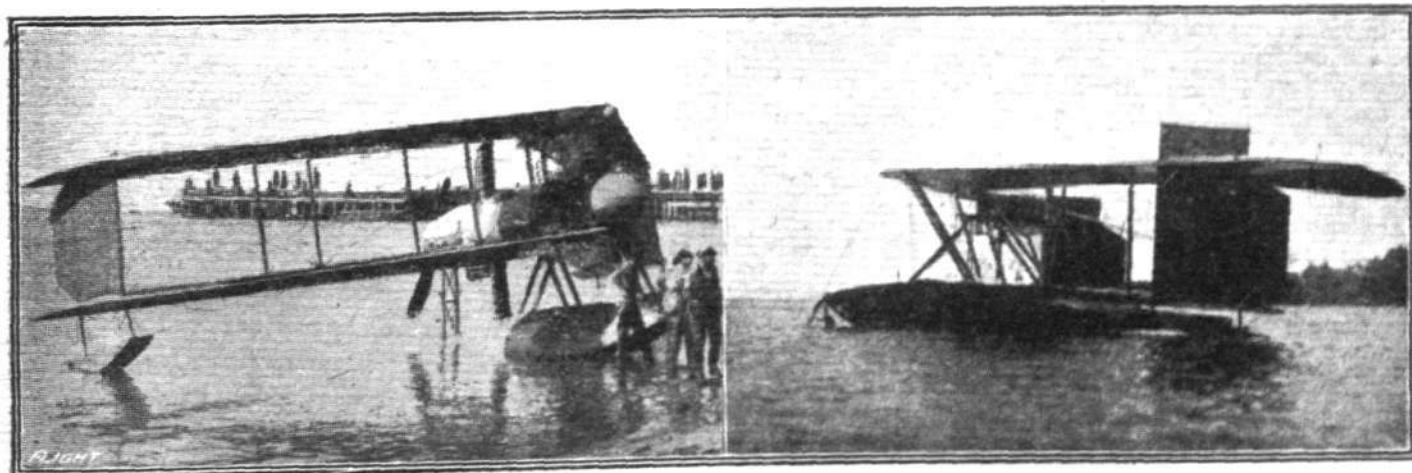
Excerpts from the "Auto" ("FLIGHT's" precursor and sister journal) of September 15th, 1906. "FLIGHT" was founded in 1908.

THE SANTOS DUMONT AEROPLANE.

M. Santos Dumont continues to prosecute his experiments in the park at Neuilly. The power of the motor applied to the machine has, as our readers are aware, been increased to 50 h.p., and on the evening of the 4th the aeroplane actually rose a few feet off the ground and executed, it is understood, a satisfactory free flight, estimated roughly at about 100 metres in distance, before again touching the ground. Great enthusiasm prevailed amongst the spectators, which was not to be wondered at, and M. Santos Dumont himself is quite naturally delighted and not a little surprised. The conquest was not a permanent one unfortunately, for on the following Friday he failed to effect free flight, though making several attempts; but this is not to be regarded as any very serious set-back, as the machine was just rising into the air, the two front wheels being well off the ground and the rear wheel on the point of rising, when M. Santos Dumont made a mistake and cut off the ignition by pressing the wrong lever, thus stopping the motor and bringing the machine to rest. Going out again on the 8th inst., M. Santos Dumont was just recommencing another series of experiments when unfortunately the cone of the propeller-shaft of the aeroplane broke, an accident which, of course, put an end to the proceedings for that day. The machine was taken back to the shed to be repaired and to have adjustments made to the carburettor, which, it is hoped, will have the effect of enabling the motor to develop the full power of its eight cylinders, which it apparently has not hitherto effectively done.

FOR THE GORDON-BENNETT CUP.

The shed in which the aeroplane is housed also contains the car for M. Santos Dumont's balloon "The Two Americas," with which he is going to compete for the Gordon-Bennett Cup. The car is provided with two lifting propellers and a De Dion motor to enable it to rise in the air and so increase the time it will remain afloat independently of the use of ballast.



By the courtesy of "Aerial Age."

DEVELOPMENT OF THE BURGESS-DUNNE BIPLANE IN AMERICA.—On the left a seaplane (140 h.p. Sturtevant) built for the U.S. Navy. Note the well streamlined nacelle and attachment of the pontoon. On the right is a flying boat, known as the Burgess-Curtiss type, which is the latest development of the Dunne system.

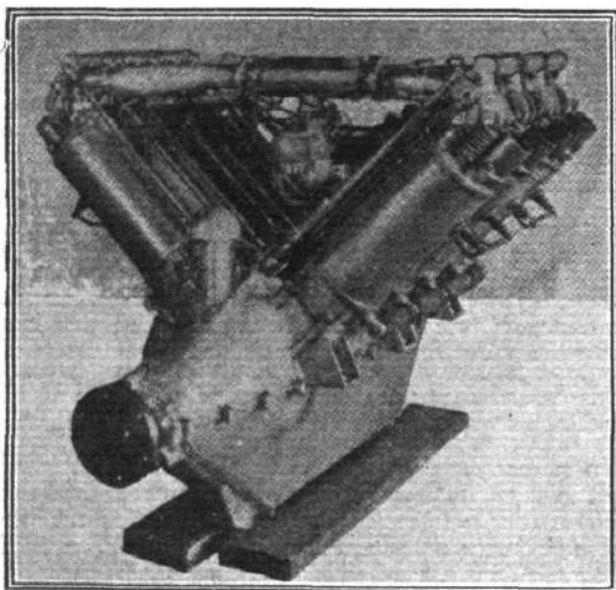
SOME AMERICAN AERO ENGINES.

THE 125 H.P. ORLO, MODEL 0-8.

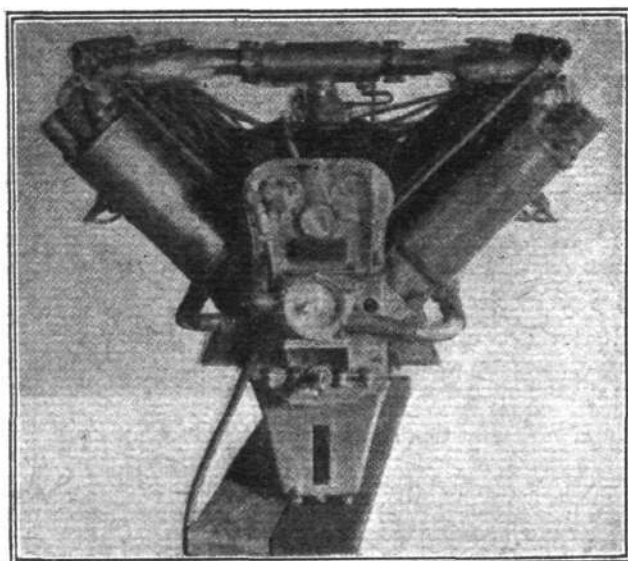
THE Orlo model 0-8 aeromotor, which is manufactured by the Orlo Motor Co., of Rochester, N.Y., is of the 8-cylinder Vee water-cooled type, developing 125 h.p. at 1,400 r.p.m. The cylinders, which have a bore and stroke of $4\frac{1}{2}$ and 6 ins. respectively, are cast separately. They are machined both inside and out to ensure uniform thickness and even expansion and contraction; the water jackets are of spun brass zinc-plated. Instead of bolting the cylinders down on to the crankcase, they are held down by steel studs which pass through the crankcase to the crankshaft main bearings, to which they are secured. Practically all the strain is thus taken off the crankcase, and the chance of a cylinder blowing off is likewise reduced.

All water and gas connections are so arranged that any one of the cylinders can be removed without dis-

section and $12\frac{5}{16}$ ins. long. As the cylinders are placed directly opposite each other, one connecting-rod big-end bears directly on the crank pin, whilst the other embraces the first big-end. The crankshaft is hand-forged from chrome-nickel steel, machined and ground to size, and carefully balanced. Five babbitt bearings support the shaft, and a ball race takes the propeller thrust in either direction. The propeller flange is forged integral with the shaft, having hardened bushings inserted half in the flange of the shaft and half in that on the propeller. This arrangement relieves the propeller bolts from all shear, besides making a very strong coupling. The cams are keyed on to a hollow shaft supported by five phosphor-bronze bearings. The crankcase, of aluminium alloy, is well ribbed for strength, and is horizontally divided along the axis of the crankshaft.



View of the propeller end of the Orlo Aeromotor, Model 0-8.



End view of the Orlo Aeromotor, Model 0-8, showing the magneto and water circulating pump.

turbing the others. The valves are nickel steel, drop forged, and are located in the cylinder heads. Valve cages are not employed, with the result that leakage due to unequal expansion is eliminated, in addition to which is the simplification in design. Inlet and exhaust valves are each operated by a separate rocker arm and push rod from the single camshaft, which is placed in the crankcase between the two rows of cylinders. The valves are thus capable of accurate timing. The valve tappets are hardened and ground, and the guides are aluminium with phosphor-bronze bushes. Zinc-plated tubular steel is used for the push rods, which have ball and socket joints top and bottom.

The pistons are of grey iron, with phosphor-bronze bearings for the gudgeon pins. Chrome-nickel steel is used for the connecting-rods, which are tubular in

Lubrication is effected by means of a force pump, which draws oil from the lower half of the crank case—which has a capacity of $3\frac{1}{2}$ gallons—and forces it to the hollow camshaft, whence it goes to the main bearings. It then passes through the crankshaft into the big-end bearings. Four nozzles on the camshaft squirt a stream of oil on to the connecting-rods, cylinder walls and gudgeon pins. Ignition is by two Dixie -80 magnetos, driven off the camshaft, which supply current for the two sparking plugs on each cylinder. The carburettor is mounted between the two rows of cylinders. An arrangement for raising the exhaust valves is provided to facilitate starting. The weight of the engine, complete with magnetos, carburettors, but without radiator or propeller, is given as 475 lbs., and the average fuel consumption is quoted as 12 gallons of petrol and 2 pints of oil per hour.

Super-Zepps. not Up to Expectations.

If any reliance is to be based upon what the Berne correspondent of the *Agenzia delle Notizie* learns from a competent German source, the new super-Zeppelins have by no means realised the great expectations based on them.

It is stated that they have proved distinctly unwieldy and very difficult to manoeuvre, and it is generally believed that the previous type of Zeppelin, which though smaller was far more reliable, will in future be reverted to. A similar story was reported *via* Amsterdam some months ago.

PERSONALS.

Casualties.

Second Lieutenant ARTHUR JAMES BOWERMAN, Somerset Light Infantry and R.F.C., reported killed, was the only child of Mr. and Mrs. F. R. Bowerman, Grangemount, Wellington, Somerset. He was educated at Queen's College, Taunton, and afterwards became a member of the staff of Sedgwick, Collins and Co., insurance brokers, at Lloyd's. Early in September, 1914, he joined the Artists' Rifles, receiving his commission in the Somerset Light Infantry in the following December, and went to the Front in September, 1915. In January of this year he was attached to the Brigade Staff as grenadier and Intelligence Officer. At the end of July he was attached to the Royal Flying Corps, and graded as a qualified Observer. Lieutenant Bowerman was 29 years of age.

Second Lieutenant GUY N. COUSANS, Royal Inniskilling Fusiliers, attached R.F.C., whose death is announced, was born in 1897. He was educated at The Wick and Uppingham, and entered Sandhurst in April, 1915. He was gazetted into the Royal Inniskilling Fusiliers and was attached to the Royal Flying Corps in February, 1916. He was sent to the front in May last as Observer. He met his death in aerial combat on September 9th. He was the only son of the late Henry Edward Cousans, and stepson of Mr. Cousans, of Kimbolton House, Huntingdon.

Lieutenant HAMISH STRATHY MACKAY, Royal Garrison Artillery and R.F.C., who is reported killed, was 22 years of age, and was the younger son of Colonel J. F. Mackay, Whitehouse, Cramond, Midlothian.

Second Lieutenant JAMES LESLIE ROBERTSON, Yorkshire Regiment and R.F.C., reported killed on September 6th, aged 21, was the youngest son of Mr. R. H. Robertson, J.P., and Mrs. Robertson, of Stoke Golding Lodge, near Hinckley, Leicestershire. He was educated at Magdalen College School, Oxford, and from there went to study farming at the Rhodesian Government experimental farm. On his return to England in 1914, having matriculated at the University of London, he entered the London Hospital as a medical student. In 1915 he joined the O.T.C., and received his commission in the Yorkshire Regiment. After being machine gun instructor for some time he was transferred to the Royal Flying Corps this year, and gained his pilot's certificate last month. When patrolling the lines he crossed to attack a hostile machine, and while doing so his machine was shot down by a Fokker.

Flight-Lieutenant CHARLES W. GRAHAM, R.N.A.S., aged 23, who was killed in a seaplane accident off the East Coast, was the son of Mr. C. K. Graham, 9, Kitson Road, Barnes,

and was awarded the Distinguished Service Order early this year for gallantry while fighting in the air. He attacked and brought down a German seaplane, which caught fire and sank off the Belgian coast. He dropped into the water and swam ashore, having been previously wounded while trying a new machine.

Wounded.

News has been received by Mr. T. Garrood, of Friary Street, Guildford, that his son, Lieutenant G. GARROOD, R.F.C., is in hospital in East Africa, suffering from wounds. Lieutenant Garrood joined the Army in 1914, and was given a commission in the Inniskillings in 1915. In May last year he went to Gallipoli, and was so severely wounded that he was thought to be dead, and placed amongst those ready for burial, his father being officially informed that he had been killed. After a long period in hospital he returned to England, and qualified as a flying officer.

Married and to be Married.

A marriage has been arranged between THOMAS RICHARD CHEFVYND, Lieutenant, 7th Dragoon Guards, attached R.F.C., eldest son of Mr. and the Hon. Mrs. Birkin, of Park House, Mapperley, Nottingham, and grandson of Sir Thomas Birkin, Bart., of Ruddington, and MARGERY TUSTIN, second daughter of the late Mr. W. J. Tustin and Mrs. Fielding-Ould, of 13, William Street, Knightsbridge, and granddaughter of the late Mr. J. Tustin, of Burstow Hall, Horley, Surrey.

An engagement is announced between Captain A. R. STANLEY CLARKE, Dorsetshire Regiment, attached R.F.C., only son of Mr. and Mrs. Stanley Clarke, of Berghmote, Wimborne, and MARJORIE, elder daughter of Mr. and Mrs. HIATT BAKER, of Oaklands, Almondsbury.

The engagement is announced of Lieutenant T. V. HUGHES, attached R.N.A.S., son of Mr. George Hughes, J.P., of Abbey Hill, Kirm, Argyllshire, and MABEL, elder daughter of Lieutenant-Colonel H. CURTIS, Rifle Brigade, of Hove, Sussex.

The engagement is announced of Flight Sub-Lieutenant H. V. TERRY, R.N., only son of Mr. and Mrs. A. Terry, of Highgate, and DOROTHY LYFTON, younger daughter of the late Mr. CHARLES WILSON, and Mrs. WILSON, of Highgate.

An engagement is announced between Flight Sub-Lieutenant NORMAN E. WOODS, R.N.A.S., younger son of Mr. William E. Woods, of Rangiora, Arthur Road, Wimbledon Park, and Sydney, and FLORENCE INNES, youngest daughter of H. I. PERKINS, I.S.O., F.R.G.S., F.G.S., Surveyor General, B. Honduras, and Mrs. PERKINS, of Wimbledon Park, and granddaughter of Major-General Ed. Norman Perkins, Bengal Staff Corps.

The Raid on Sofia.

CARRYING a message from General Sarrail to the French Minister at Bucharest, Sub-Lieut. Noel—so well known at Hendon—and Lieut. Leseur on September 14th flew from Salonica to Bucharest, a distance of 350 miles, after dropping several bombs and a parcel of proclamations on Sofia. Two other French machines also started from Salonica with a similar mission, and landed in Roumania safely. Details, as given by one of those which reached Bucharest, are as follows:—

"Four machines left Salonica at 20 minutes past six in the morning on a military mission, and with orders to drop bombs on Sofia as a reprisal for the recent bombing of Bucharest.

"We arrived over Sofia at 20 minutes to 10 without having met with any adventures on the way. The gilded dome of the Royal Palace glittered in the brilliant sunshine, and served as a splendid mark. Several fires broke out. We were heavily shelled without being hit. A German aeroplane also attempted to attack us, but met with no success. At 20 minutes past 11 the first aeroplane arrived at the Bucharest aerodrome. The second reached the same place at 3 o'clock, while the two others landed in Roumanian territory."

A translation of the proclamation which was dropped is as follows:—

"People of Sofia! The soldiers of the Entente do not fight against the civil population. Our airmen bomb only military establishments. Zeppelins and German aeroplanes throw bombs on Salonica and Bucharest, assassinating old men, women and children. The Germans alone are capable of such deeds. Such crimes call for vengeance. People of Sofia! Your town to-day expiates the crimes of your allies.

If such crimes are again committed, they will be followed by the same punishment."



A sketch-map of Noel's Sofia strafing flight.

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British.

General Headquarters (France), September 12th, 10.7 p.m.

"In the course of aerial fighting yesterday one of our machines, which returned safely, collided with a hostile aeroplane, which fell out of control and disappeared in the clouds. To-day a hostile machine was brought down in flames in our lines near Pozières. Two of our aeroplanes failed to return."

General Headquarters, September 14th, 10 p.m.

"Considerable aerial fighting this morning, two hostile machines being brought down in flames and one other driven to the ground. One of our aeroplanes is missing."

War Office, September 14th.

"Tigris Line.—On the morning of the 11th inst. the enemy's aerodrome was raided by our airmen, who destroyed a small camp."

General Headquarters, September 15th, 10.14 p.m.

"Our air service to-day has kept up constant and successful co-operation with our artillery and infantry, and frequent and accurate reports have been furnished of the course of the battle. Hostile artillery and infantry have been effectively gauged (?) by our aeroplanes with machine-gun fire."

"Many bombing attacks have been carried out against hostile aerodromes and railway stations, in the course of which troop trains were hit and transport railway siding attacked with machine-gun fire. Another German kite balloon has been brought down. The total number of hostile aeroplanes destroyed to-day is 13. Nine others have been driven down in a damaged condition. Four of our machines are missing."

General Headquarters, September 15th, 12.50 p.m.

"Much aerial fighting has taken place. Four hostile machines were brought down in flames, and at least four others driven down damaged. One hostile kite balloon was brought down last night and one this morning."

"Our aeroplanes co-operated with advance of our infantry from a close height, firing on the enemy on the ground. Bombs were successfully dropped on three of the enemy's headquarters, and the railway station at Bapaume was also successfully bombed, much railway stock being damaged and one train destroyed."

General Headquarters, September 16th, 11.28 p.m.

"Further reports of the aerial fighting on the 15th bring the total number of German machines destroyed to 15. Another hostile kite balloon was brought down in flames this afternoon. Two more of our machines are missing, making six in all."

General Headquarters, September 17th, 12.47 p.m.

"Our air service successfully continued its attack upon enemy communications. Another enemy machine has been destroyed. Three of our machines are missing."

General Headquarters, September 18th, 4.5 p.m.

"During the past week, in the battle area only, 14 hostile aeroplanes have been reported as crossing our lines, while our machines have made between 2,000 and 3,000 flights across the enemy's lines."

General Headquarters, September 18th, 11.24 p.m.

"There was considerable aerial activity yesterday. Several enemy machines were driven down. Four of our machines are missing."

War Office, September 18th.

"Egypt.—A mobile column, composed of Anzac mounted troops, camel corps, with some artillery, left Bir-el-Abd of September 6th, with a view to carrying out a reconnaissance of enemy troops west of El Arish."

"The attack appears to have been a surprise to the Turks, and our aircraft saw and fired on several parties of them, amongst whom were German officers, riding rapidly back to El Arish."

French.

Paris, September 12th. Afternoon.

"Last night one of our air squadrons bombarded the cantonments of Semoncourt, the railway station of Metz, Sablons and the military factories of Dillingen. One of our pilots brought down an enemy aeroplane, which fell east of Radurt, on the Somme front."

Paris, September 13th. Afternoon.

"On the Somme front our aeroplanes fought 17 fights yesterday. Two German machines were brought down, one in the direction of Aizecourt, and the other in the neighbourhood of Moislains (north and north-east of Peronne). Four other enemy machines appear to have been badly damaged."

"Last night our bombarding squadrons dropped a large number of bombs. Eighty-seven bombs of 120 mm. were dropped on the railway station and hutments of Guiscard, where two explosions followed by a fire were noticed. Twenty-four bombs were dropped on the railway station of Roisel and on depôts at Hendicourt. Seventy-four bombs were dropped on enemy installations in the region of Etain, 32 on bivouacs in the region of Damvillers, and six on the railway station of Montmédy. During the same night one of our bombarding groups carried out the following operations: 105 bombs were dropped on the railway station of Thionville, 60 on the iron foundries of Uckingen (during this bombardment one of our machines covered the distance to the scene of the operations twice), six on the iron foundries of Rombach, and six on the railway line between Metz and Pont-à-Mousson."

Paris, September 14th.

"Salonica.—An enemy aeroplane was brought down by one of our machines near Burdovich."

Paris, September 15th. Afternoon.

"Four French aeroplanes dropped a large number of bombs on Sofia. One of the French machines, continuing the raid finally landed at Bucharest."

Paris, September 15th. Evening.

"On the Somme front our pilots particularly distinguished themselves to-day in numerous combats above the enemy's lines. Sub-Lieut. Guynemer brought down his sixteenth, Sub-Lieut. Nungesser his twelfth, Lieut. Heuriaux his sixth, and Sub-Lieut. De Rotheftort his sixth aeroplane. Moreover, it is confirmed that in one of the recent fights Lieut. Deullin secured his sixth victory. Two other German machines, attacked at very short range, were forced to descend in a seriously damaged condition."

"On the Verdun front an enemy machine was brought down to the north of Douaumont. In the Vosges our anti-aircraft guns brought down a Fokker, which was dashed to pieces on the ground near Luses."

"Our bombarding aircraft showed great activity during the night of the 14th. A squadron of 10 machines dropped 77 bombs of 120 mm. and eight incendiary bombs on the railway stations and the lines at Tergnier and Chauny, and on the station and the huts at Guiscard. Many of the bombs found their mark. A big fire was observed at Tergnier and the beginning of an outbreak at Guiscard. Another squadron dropped 40 bombs on the barracks of Stenay, where several fires were observed, and 40 on the works at Rombach. One of our pilots made his way to Dillingen, in the valley of the Saar, in order to drop eight bombs on a large storehouse, where a fire broke out. During the same night the blast furnaces at Rombach received 10 bombs, and the railway from Metz to Pont-à-Mousson four, which caused considerable damage."

Paris, September 16th. Afternoon.

"According to the latest reports, besides the nine German aeroplanes brought down yesterday on the French front, six other enemy machines were forced to come down in a damaged condition in their own lines after fights with our pilots. Two of the passengers in the German machines were killed."

"On Thursday night one of our air squadrons dropped 106 heavy bombs on the military establishments of Pont Faverger and Betheniville. A large fire broke out at Pont Faverger. Each of our machines carried out two trips. The same night the railway station of Conflans received 174 bombs of 120 mm., of which many struck their objective."

"Salonica.—One of our air squadrons dropped many bombs on Monastir."

Paris, September 16th. Evening.

"During the night of the 15th one of our bombarding squadrons carried out the following operations: Sixty bombs of 120 mm. and six of 200 mm. were dropped on the blast furnaces of Utkingen, 30 bombs of 120 mm. on the blast furnaces at Rombach; and, thirdly, others on the works in the Mondelingen district."

"During the same night two of our machines dropped 14 bombs on the railways south of Metz. The railway station of Bernsdorf and the stations of Spincourt and Longuyon also received 60 projectiles. Yesterday evening a German aeroplane dropped several bombs in Rheims. Two civilians, one of them a child, were killed and another was injured."

Paris, September 17th. Afternoon.

"Yesterday an enemy aeroplane was brought down in our lines at Biaches and another one at Belloy. It is confirmed that an enemy machine, which was attacked by machine-gun fire by Adjutant Lenoir, came crashing to the ground north of Douaumont. This is the eighth brought down by this pilot. It is also confirmed that Adjutant Dorne defeated his tenth enemy machine, which fell on September 15th between Brie and Ennemain."

"On Friday night two of our machines dropped 15 bombs of 120 mm. on the airsheds of Hatsheim. Last night 230 bombs were dropped on the railway station and aviation buildings of Tergnier, and 32 bombs on the railway station of Abbecourt. On the same night our bombarding squadrons carried out the following operations: They dropped 72 bombs of 120 mm. on the railway stations of Roisel, Epéhy and Athies, and on the railway line between St. Quentin and Ham."

Paris, September 18th. Afternoon.

"Adjutant Tarascon brought down his fifth enemy aeroplane, which fell near Deniecourt. On the same day Lieut. Heurteaux brought down his seventh machine."

"Our air squadrons carried out various bombardments. Twelve bombs were dropped on the railway station of Nantillois, and 33 bombs were dropped on Villiers, Carbonel and Hovghy from a height of 800 metres, and caused serious damage."

Russian.

Petrograd, September 13th.

"In the region of the town of Riga and the River Dvina the activity of the enemy's air fleet has increased considerably."

Italian.

Rome, September 13th.

"Last evening enemy aircraft bombarded Venice, Pordenone, Latisana, Marano, Cervignano and Aquileia—wounding a few civilians and doing slight damage."

Rome, September 14th.

"Yesterday afternoon in unfavourable atmospheric conditions a squadron of 22 of our Caproni battleplanes, escorted by Nieuport chasers, made a raid on Lloyd's arsenal and the seaplane sheds near Trieste. One hundred and seventy-two bombs, equivalent to 5 tons of high explosives, were dropped on the railway establishments and the ships in construction. Large fires were observed. The aeroplanes were attacked by the enemy's anti-aircraft artillery and by seaplanes, but all returned to their sheds."

"Last night an enemy air squadron bombarded San Giorgio di Nogaro, Villa Vicentina, and other places in the Lower Isonzo district. One man was killed and some fires were caused."

"Enemy aircraft dropped bombs on Auronzo without doing any harm. Seaplanes directed against Ravenna were driven off by our batteries and aeroplanes."

Rome, September 15th.

"One of our aeroplane squadrons in air fight succeeded in bringing down two enemy seaplanes in the day off Panzano."

Rome, September 16th.

"Some of our Farman and Voisin aeroplane squadrons yesterday dropped bombs on the works and sheds of the narrow-gauge railway in Comignamo (Komen). Effective results were observed, and all our aeroplanes returned safely."

Rome, September 17th.

"Last night an enemy aeroplane squadron dropped 12 bombs on Mestre. No one was killed, and the damage done was slight. During an air fight in the Caporetto Basin an enemy aeroplane was brought down; one of the aviators was killed, the other captured."

Rome, September 18th.

"Enemy air raids on the Asiago Plateau, Caorio (Vanoi Cismón) and in the Biois and Cordevole Valleys are reported. Last night an aeroplane squadron again dropped bombs on Mestre. In these raids no damage was done and there were no casualties. Two of our aeroplanes dropped bombs on Mattarello and near Trento forced an enemy seaplane to land."

Another squadron of our Caproni battleplanes, escorted by Nieuport chasers, dropped bombs on the stations at Dotteglano and Scoppo, on the Carso, hitting the railway establishments, the adjoining stores, the water tanks and trains standing in the stations. All our aeroplanes returned safely, although chased by the enemy and fired on by anti-aircraft batteries."

Roumanian.

Bucharest, September 12th.

"In aerial attacks the enemy aeroplanes dropped bombs on the town of Piatra-Neamtz, killing an old man and seriously injuring two children."

Bucharest, September 17th.

"Enemy aeroplanes dropped bombs on Constanza, killing two inhabitants and wounding four."

German.

Berlin, September 12th.

"On the evening of September 9th an enemy airman who had apparently lost his way appeared in the region of Rottweil and dropped three bombs, which caused no damage, falling on uncultivated ground."

"Equally unsuccessful was an attack made by several aeroplanes upon the town of Saarburg, which is of no military importance, on September 10th."

Berlin, September 16th.

"Six enemy aeroplanes were shot down, including one by Lieut. Wintgens and two by Capt. Boelcke. The latter has now put 26 aeroplanes out of action."

Berlin, September 18th.

"Our airmen threw themselves against strong enemy air squadrons, and shot down in victorious fighting 10 enemy airmen."

"Balkans.—German seaplanes on the 16th inst. successfully attacked railway works and enemy columns in the Northern Dobrudsha. An enemy seaplane squadron at sea off Tuzla was bombarded. One of the seaplanes was hit. All our seaplanes returned safely."

Austrian.

Vienna, September 13th.

"Last night a seaplane squadron dropped numerous bombs on the railway precincts and military works at Cervignano. Two large fires and one serious explosion were caused. Several full hits on the railway station were obtained."

"Another seaplane squadron the same night attacked the naval port of Venice. Hits by very heavy bombs were observed in the arsenal and the docks, near the gasometers, in the Fort of Alberoni, and in the docks of Chioggia. Despite very heavy bombardments, both seaplane squadrons returned safely."

Vienna, September 14th.

"On the afternoon of September 13th an enemy aeroplane squadron, consisting of 18 Caproni machines, escorted by three battle aeroplanes, delivered an attack against Trieste. To support the air squadron six enemy torpedo-boats and two motor-boats appeared in the Gulf. Numerous bombs were dropped, but only very inconsiderable material damage, and no military damage at all, was caused. As far as is known up to the present, one man was slightly injured."

"Naval Lieut. Banfield forced one enemy machine to descend after an aerial engagement, and forced it to retreat behind the enemy line. Our own aeroplanes and anti-aircraft guns scored hits on the enemy torpedo-boats."

"At the same time an enemy aeroplane squadron appeared over Farenzo and dropped about 20 bombs. Apart from the destruction of a field-hut, no damage was caused."

Vienna, September 15th.

"On the night of September 13th-14th one of our seaplane squadrons successfully bombarded military objects in Grado, and a second squadron the railway establishments and other military objects in San Giorgio di Nogaro. Several direct hits were made, and great fires were observed. All our aeroplanes returned in safety."

Vienna, September 17th.

"On the night from the 16th-17th one of our naval aerial squadrons dropped heavy bombs with success on the railway station at Mestre. All our machines returned unharmed."

Turkish.

Constantinople, September 12th.

"On the 11th we successfully threw bombs on an enemy camp, causing fires."

Bulgarian.

Sofia, September 13th.

"Our hydroplanes attacked the enemy's fleet in the harbour of Kavalla with success."

BRITISH AIR WORK.

THE following was issued by the Admiralty on September 15th :—

"Between August 25th and 31st a series of attacks were carried out by naval aircraft upon the Bulgarian lines of communication beyond Kavalla. On the 25th the railway station and bridge at Buk were successfully bombed.

"On the 26th a similar attack upon the railway station at Drama resulted in the burning of a large petrol store and considerable destruction among the rolling-stock in the sidings. Bombs were also dropped on the billets of the enemy's troops at Doksat.

"On the 27th, Okgilar railway station, where the headquarters of the 10th Division were situated, was successfully attacked. The station buildings were set on fire and considerable damage was done to the permanent-way.

"On the 28th, Drama Station was again bombed. The station buildings were considerably damaged. On the same day Kavalla forts were attacked with excellent results.

"On the 29th a large body of infantry and transport concentrated at Porna were attacked. Considerable havoc was caused in the village and among the troops. A large fire was started among the stores in the transport park. The moral as well as the material effect of this bombardment seems to have been considerable, as a reconnaissance made on the following day showed that all troops, camps and transport had been removed from this district.

"On the 31st an attack was made on Angista Railway Station. Direct hits were made and extensive damage caused."

The following was issued by the Admiralty on September 16th :—

"In the early hours of the 15th inst. a squadron of naval aeroplanes successfully bombarded the enemy's heavy batteries near Ostend. All our machines returned safely.

"Between August 25th and 29th a series of attacks and reconnaissances upon the enemy railway communications in Palestine were carried out by a British seaplane squadron. These flights were made under somewhat hazardous conditions, due to the fact that the railway runs, for the most part, behind a range of mountains difficult for seaplanes to surmount. Bombs were dropped on Afulah Junction, where considerable damage was done to the rolling-stock, permanent way and to stores in the vicinity. A railway engine and 14 carriages were also set on fire and destroyed. The railway stations at Tulkeram and Ardana, and an enemy camp 4 miles north-west of Remleh, were successfully bombarded and severely damaged.

"On August 26th a seaplane bombarded the railway station at Homs. This flight, carried out at a distance of 45 miles inland under extremely adverse conditions and through clouds low down on the mountains, was a singularly fine performance for a seaplane."

The following was issued by the Admiralty on September 18th :—

"On the afternoon of the 17th inst. a squadron of naval aeroplanes carried out a further attack on the enemy aerodrome at St. Denis Westerem.

"A large number of bombs were dropped with successful results.

"One of our machines was obliged to make a forced landing in Holland, and the pilot has been interned."

A German Version.

Berlin, September 18th.

"On the afternoon of the 17th inst. German seaplanes dropped a large number of bombs on hostile naval forces off the coast of Flanders. A hit was clearly observed on a parent ship, and one enemy airman was compelled by anti-aircraft fire to land on the Dutch coast."

With regard to this report, the Admiralty states that none of His Majesty's ships were hit or damaged in any way.

THE following résumé of incidents in aerial warfare, extracted from recent reports of the Royal Flying Corps in

France and Egypt, was issued by the Air Board on September 14th :—

"In Egypt on August 11th a B.E. 2c machine was completing a reconnaissance of the flanks and front of our positions when it was surprised and attacked from above and behind by two hostile machines, the first indication of their presence being the heavy machine-gun fire poured into it from close range. The pilot was shot in the jaw, the shoulder, left hand and left leg. He lost consciousness, but regained it when 500 ft. above the ground, and made a landing. The observer was shot in the chest and shoulder. The latter with great effort gave his report when lifted out of the machine and then collapsed. He died of his wounds some hours afterwards.

"One of our airmen in France attacked five hostile machines on August 16th. He engaged a Roland, causing it to dive, and then climbed and dispersed the remainder, two of which he forced to descend.

"In France on August 22nd an offensive patrol encountered a formation of about fifteen German machines, chiefly Rolands and L.V.Gs. These were engaged by our F.E.s, assisted by one Nieuport Scout. The engagement became of a general nature, all our machines being engaged. One enemy machine was seen to side-slip and plunge to earth out of control, and was subsequently seen on the ground in a wrecked condition. Three others were driven down by the combined attacks of our machines, and appeared to be completely out of control, although lost to view before hitting the ground. One of these (a Roland Scout) was seen to be emitting clouds of smoke as though on fire. Three other machines were seen to land under control, and the whole hostile formation was completely broken up.

"The following is an account of a fight given by one of our pilots: 'While on defensive patrol we saw one of our F.E. 2B's doing photography. We followed this machine, going east of it, when we observed five enemy aircraft evidently intending to attack the photographic machine. We fired at them, opening fire at 500 yards. The enemy immediately split up their formation, diving and making off in all directions. We closed with one machine, firing two drums into it, and actually set it on fire, but after a few seconds the flames went out. We then engaged another machine, firing one drum at it, but could not get close to it. All five hostile machines made for the ground.'

"The escort to bombing machines of one of our Brigades encountered about 20 hostile machines flying in three formations, which were engaged separately. A Nieuport aeroplane first engaged the rear machine of a formation of seven Rolands, into which it fired 1½ drums at a range of about 15 yards. The enemy aeroplane was seen to dive to earth and turn over on its side. Our airman then turned his attention to five more Rolands, discharging two drums into one from underneath. The enemy machine turned and dived very steeply out of control, with fire and smoke coming out of the fuselage. The German formation was broken up, but our pilot got level with another machine and discharged the remainder of his ammunition into it. The enemy machine fell out of control and crashed on to some houses in the village below. During this time our F.E.s were busy fighting hard, and managed to disperse what remained of the enemy formations. Numerous enemy machines were seen to descend and land in all directions. The pilot above referred to returned to one of our aerodromes for more ammunition, and went back to the scene of the encounter, where he engaged and dispersed such enemy machines as had remained in the vicinity.

"On August 28th the pilot of the Nieuport Scout above referred to attacked four hostile machines. He manoeuvred underneath the nearest, and fired one drum into it. The German immediately went down in an uncontrolled dive, closely followed by our airman, who fired another drum into it at about 20 yards' range, and saw the hostile machine crash to earth. Before this he had engaged three enemy machines, two of which were seen to make forced landings.

From Other Sources.

Mr. Laurence Jerrold, in the second of his series of articles on the Somme in the *Daily Telegraph*, says :—

"'In aviation the Boches have ceased to count,' said the

young, dark captain at the aviation camp of B—, near A—, and the other young captain, this time fair, with a wisp of yellow moustache and a perpetual cigarette, echoed

him. These French aviators are keenness itself. Most of them were engineers, architects, artists before the war. Since the war they have created entirely new methods, and have brought them to the pitch of perfection. 'What will you do after the war?' I asked. 'Oh, use the same methods for exploring and photographing Africa and Asia, or something of that sort.'

"In aviation 'les Boches n'existent plus,' everyone in this camp agrees. Since the Somme offensive no German aeroplane has ever dared to cross its own lines into French territory. The French have invented methods of air photography the perfection of which is almost miraculous. 'Does not the enemy do the same?' I ask. 'No, he never comes to photograph us because we never let him.'

"In July 58 German aeroplanes were brought down by the French attacking squadron. One of the new French machines alone brought down seven Boches, and not one of these machines was lost. These are the new attacking machines of extraordinary speed. There are other new French aeroplanes of great power. Some of these have lost a gunner killed, but all have always come back.'

"One of the French aviator-captains who showed me over the camp was the officer who had himself read the letter taken from a German aviator officer moaning over the incompetency of German aviation. That German aviation has ceased to count on the Somme is no exaggeration at all. One morning I saw over twenty French sausages lolling in the air, where they cast a seeing eye upon the German positions. Not a single German sausage was anywhere to be seen—none has been seen for weeks. 'The moment a German sausage comes up one of my men rises and puts an inflammatory fuse into the thing, and it bursts up,' said the aviator captain.

"It is the same with the aeroplanes—not one dares cross over the lines. The result is that the German artilleryman is blind. He fires over and over again at the same place upon which he had long ago trained his gun, but he can fire nowhere else with any knowledge. French mastery of the air on the Somme is an absolute fact. But in the air, on the Somme, the Boches are now powerless, and the French work their war machine absolutely peacefully. Their aviators have told them that they are safe from air attacks, and they know it is a fact.

"There are three kinds of aviation services, each very different from the other. The attacking aeroplane squadrons are the dare-devils and adventurers of the air. The infantry aeroplanes are scouts who lead attacks and hover over the foot soldiers as they leave the trenches for the attack, and from minute to minute send down information. The aviation photographic service, the third department, is the real eye of the army, and it is this service which by photographs keeps

the fighting line informed from hour to hour of the enemy's positions.

"The fighting aviators are wild young chaps, who, in the intervals of risking their lives heroically, amuse themselves furiously. There is nothing to be done with them when they are off duty, and everyone then gives them their tether. Back to duty in their flying machines, they are once more dare-devils of the air. There is a new machine, several of which I saw flying off and returning, which can swoop down in a few seconds vertically upon an enemy. 'The machine is quite good,' said the aviator captain, 'but, unfortunately, after a few months of driving it one is apt to get a touch of heart disease.'

"The infantry aviators, who watch an attack from the trenches and report step by step the advance, are steadier chaps than the wild flyers of the attacking air squadron. They fly quite low over the foot troops, as the latter advance, and even go down to less than 200 yards from the ground. They are the infantry air scouts, and the information they send down gives commanding officers an assurance and confidence which could be equalled by no other means.

"The third air service is that which miraculously, as it would have seemed a few years ago, brings to Headquarters in a few minutes absolutely faithful photographs of all the enemy's positions. Think what this new service means. An aeroplane flies out over the enemy's trenches, and maps reproducing the exact plan of the enemy's trenches from the photographs taken are dropped into the French trenches. The aviator carries special cameras. The photographs are developed, and the lines of trenches are reproduced on a map. The map is printed by hand to the requisite number of copies by a delightfully smart process; copies of the map reach each commanding officer concerned. The perfection which has been attained in the taking of photographs, the reading of them, the reproduction and the printing off by hand of the maps, surpasses anything which could be imagined. There is nothing like this aviation camp in the world, and it has all been created since the very beginning of the war. Hundreds of young officers work there with a seriousness and a keenness which are admirable. It is one great, perfect machine, and in all—in the daring flyers who dash over the enemy's lines, and in the men who develop, read and print these photographs, upon which so much, indeed everything, depends—there is the same steadfast purpose and the same enthusiasm.

"But they only count by results, these young Frenchmen, who have made a business of war, and who make it thoroughly. 'Don't the Germans take the same war photographs?' I ask. 'They would if they could, but, you see, we don't let them. *L'aviation Boche n'existe plus.*'"

A Long-Distance Flight in America.

ON August 25th, Pilot Victor Carlstrom made flights at Newport News, Va., which so far established the best records yet made to win the Marine Flying Trophy and the \$1,000 cash prize given by Mr. Glenn Curtiss. Carrying a passenger the entire time Carlstrom flew a twin-motored JN hydro-aeroplane 661 miles, using a total flying time of 8 hours 41 minutes. His course was between two points 25.44 miles apart, and most of his flying had to be done with aid of compass, as a heavy fog had settled over the water. The contest opened April 15th, and will close October 31st.

A Danish Trans-Atlantic Project.

LIEUTENANT POLLNER, a young and well-known Danish military aviator, has planned to make a record by crossing the Atlantic, says the *Daily Telegraph* correspondent at Copenhagen. A Danish flying-machine expert states that he will be able to carry out the plan by means of a machine supplied with a motor of 350 h.p. The distance from the Faroe Islands to Newfoundland could, he states, be made in about 30 hours, and the whole trip to New York in 48 hours.

The Cost of a Zepp. Raid.

SOME interesting speculations as to the cost of the last Zeppelin raid were given by M. Louis Forest in the *Matin* last week. Basing his observations on the principle that Germany entered the war as a business proposition, M. Forest puts the following on the debit side of the balance-sheet:—

- £1,200 for petrol.
- £600 for oil.
- £1,000 for bombs.
- £3,000 for refits and repairs.
- £250 for Wolff telegrams.

- £60,000 for the loss of a Zeppelin.
- £10,000 for pensions; and
- £10 for Iron Crosses.

He credits to the other side of the account two British lives lost, and, assuming that he is Hindenburg making out a report to the Kaiser, proceeds:—

"Your Majesty will readily perceive that this expedition gives us something substantial to go upon for the solution of the problem before us, and which alone can gloriously terminate the war, namely, the destruction of England. The loss of two Englishmen having cost us close upon £80,000, a simple calculation suffices to show, taking the population of Great Britain in round figures at 46,000,000 of souls, that in order to kill off the lot we shall not be obliged to spend more than £1,840,000,000,000. I venture to think that there will be no difficulty in obtaining this sum from the Minister of Finances, especially when it is considered how reasonable it is compared with the results it will achieve.

"The money part of the problem settled, there only remains one small point to be got over. The destruction of two Englishmen having cost us the lives of 20 Germans, a superficial mind might imagine that we ourselves shall all be wiped out before we have encompassed the death of every inhabitant of Great Britain. Seeing, however, that the permanent Committee of German Professors established to deal with the problems of the war has always been able to demonstrate that what must be done for the pursuance of German aims can always be accomplished, I do not doubt for a moment but what the same Committee will discover a formula proving that this particular point is only an apparent difficulty, and not of a nature that need for a moment trouble or thwart our activity.—HINDENBURG."

Roumanians Bring Down a Parseval.

DETAILS of the bringing down of a Parseval which raided Bucharest are given in a despatch from the *Daily Chronicle* correspondent at the Roumanian capital. He says:—

"We were not allowed to wait long before war was brought home to us here in the capital. We had gone quietly to bed at 10 o'clock on the Monday night after that exciting Saturday. Soon after 1 the mournful tolling of the big bell of the Metropole and the police whistling which succeeded it let all Bucharest know it was the announcement of an aerial visit. Though orders were for all to retire to their cellars (if they had one), everybody crowded in the lightest of raiment into the streets to see the fun.

"A Parseval and an aeroplane, coming from the direction of the Danube—that is to say, Bulgaria—had been signalled, and their route to the capital was heralded by the sound of the anti-aeroplane and machine guns fired at the enemy craft. On they came, but only to be caught up very quickly by the searchlights. Shells flashed round the airship; she hesitated, turned, and, pausing once more, moved off riverwards, many who watched her declaring that her nose had dipped.

"Now this is true, though for certain reasons the Government are silent on the matter. The Parseval, which has been seen by a large number of people, is lying a mangled, shapeless mass, outside Bucharest, with a cordon of troops round it. It is of aluminium. Of the fate of its crew accounts differ. Some state that all (10 they were) were killed and horribly mutilated; others say but three were dead; the rest, injured, are in a hospital (which is kept secret). They were Germans and in German uniform, and the craft came from Sofia, and one café reason for keeping the matter quiet is because this country has not actually declared war on Germany or Bulgaria.

"In any case it is a splendid feat of arms, and that by an army wholly new, except in theory, to such work. The very guns that threw the shells that brought down the airship were only lately constructed from plans in the army's own workshops here in Bucharest.

"So, tragically for the invaders, ended the first air attack on Roumania. The actual damage from bombs dropped was the corner of a small house knocked down, where a girl had a slight temple wound from a falling brick. Several bombs buried themselves harmlessly in the earth.

"The aeroplane made off, but came back the following night, apparently searching disconsolately for its companion, but disappeared when fired on."

A German Aeroplane in Holland.

BEARING on its tail the number 97, besides having a mark A20-16, a German aeroplane has landed near the village of Roosteren, in Holland. The pilot, an officer, who said he had been making a reconnaissance and his base was Cologne, has been interned. The aeroplane was armoured, and carried a machine gun and photographic apparatus.

Precautions in Wilhelmshaven.

An announcement, signed "Festungskommandant," has been published in the *Wilhelmshaven Zeitung* ordering more stringent precautions in the naval ports against air attacks. No more lights are to be shown in streets, yards, gardens, private or public buildings. Curtains and blinds which have hitherto been considered a satisfactory precaution are now regarded as insufficient. Illuminated signs are prohibited, and all the special light permits are withdrawn. Shop windows are to show no more than just sufficient light to enable customers to distinguish the goods. Rehearsals of arrangements for the safety of the public will be held nightly until further notice."

Another Fairy Tale.

THE notorious Wolff agency must look to its laurels, for the "German Newsagency for Foreign Policy" has eclipsed all the Wolff fabrications.

Its Christiania correspondent has interviewed a Norwegian merchant, who says that he spent the night shivering in the cellar of big business offices near St. Pancras in the company of the King, the Queen and the Duke of Connaught, who had just arrived at St. Pancras but could not get to Buckingham Palace because the streets were torn up by Zeppelin bombs. The merchant adds that the King remained for an hour and a half in the cellar, only speaking three words. He adds that London is a maze of underground bars, business offices, shops, and theatres, all advertising themselves safe from Zeppelins, and that practically every house in London is an ammunition factory.

Apparently the agency has reached the limit, for the story arouses some mild doubt even in the mind of the *Hamburger Fremdenblatt*.

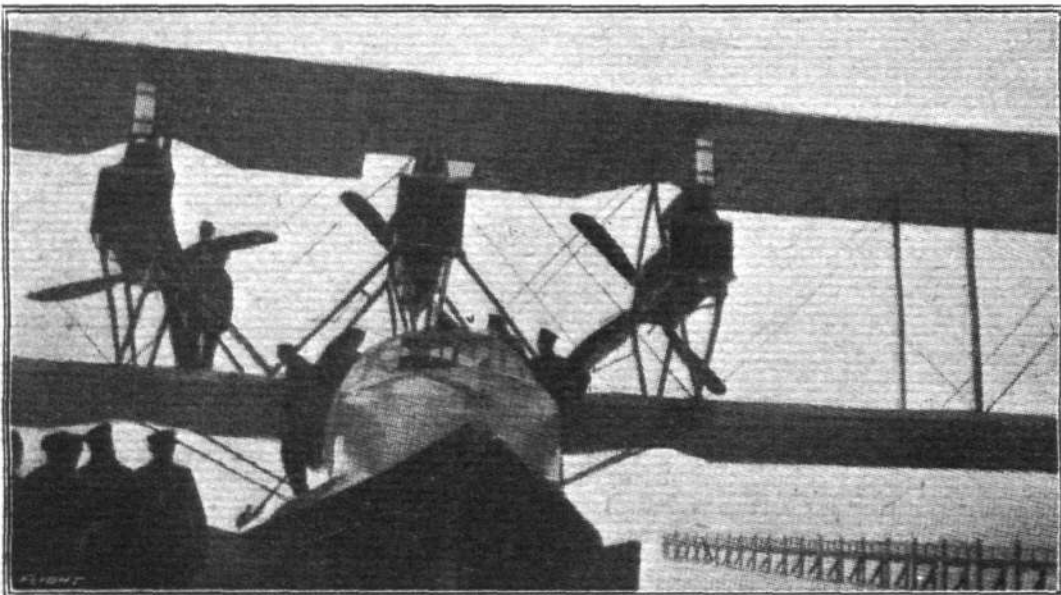
Count Zeppelin Endorses "Frightfulness."

THE *Norddeutsche Allgemeine Zeitung* says that the following "explanation" that he is in no way hindered in the use of his airships against England, has been sent by Count Zeppelin to the Imperial Chancellor, dated September 5th:—

"I am informed that in the course of the agitation carried on by your Excellency's enemies it is continually asserted that I have stated it to be my view that from consideration for England or from a desire not to render an understanding with England difficult, and thus from some political motive the greatest possible effective and ruthless use of Zeppelins is not being made.

"I am convinced that the employment of Zeppelins is in nowise hindered by any political or other considerations. I need not tell your Excellency that I am in nowise a party to this misuse of my name. I sincerely deplore it, and I leave it to your Excellency to make any use you desire of this explanation."

Commenting upon this the *Deutsche Tageszeitung* says that "as a whole or in detail does not give one the impression that it was spontaneous, and solely on Count Zeppelin's initiative."



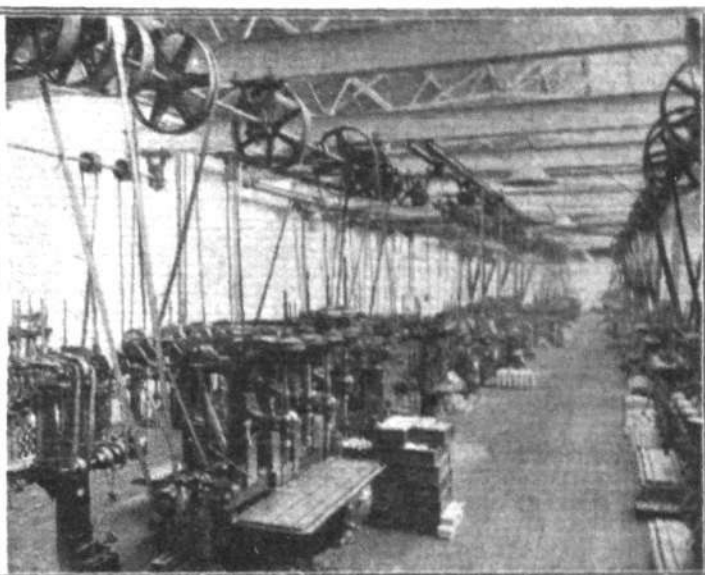
A Modern Battle-Cruiser of the Air.—The Curtiss "Super-America" flying boat, which is capable of rising from, and alighting on, very rough seas. It is equipped with three high-powered Curtiss motors. (Photo. by courtesy of "Flying.")

C.A.V. DYNAMOS, THEIR MAKERS & OTHER MATTERS.

PROBABLY the most severe test to which a factory organisation can be put is for it to be expanded and enlarged to many times its original size during a few years. Through such a test, or rather series of tests, the firm of C. A. Vandervell and Co., the electrical specialists, has come through with flying colours. Those who were acquainted with the original

works can be gathered from the fact that they now cover some 7½ acres, while the number of employees is round about 3,000.

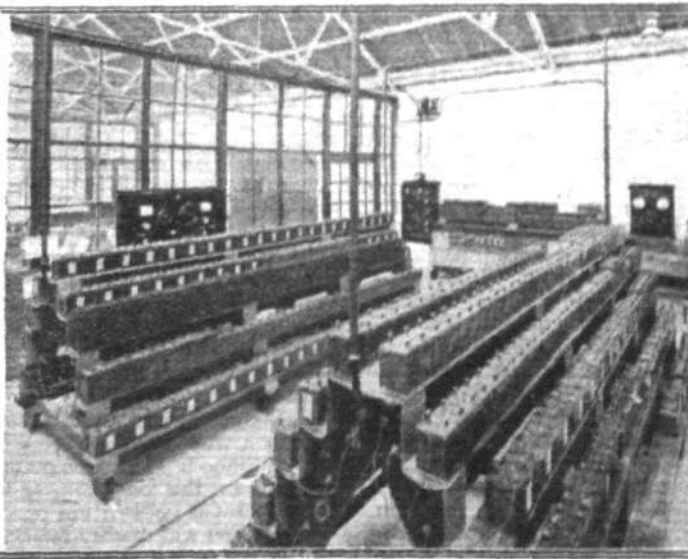
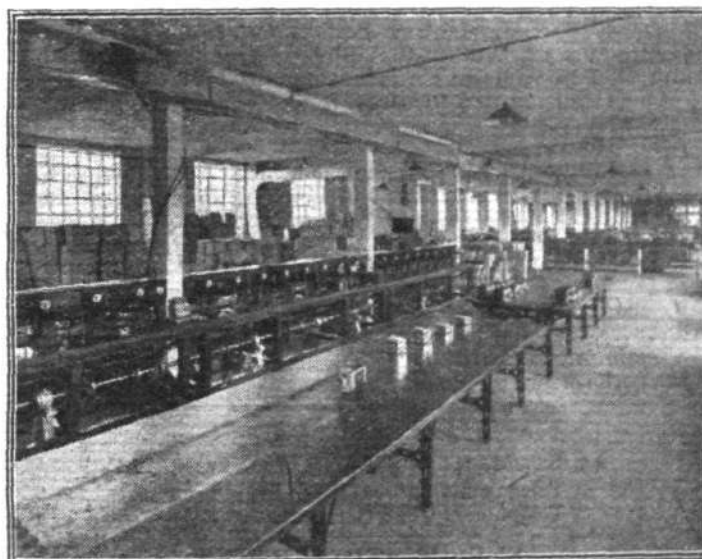
Of course, at the present time the production of those electrical specialities which have made the C.A.V. trade-mark famous the world over, is largely held up by more



THE C.A.V. WORKS.—The east front of the main building, and on the right a view of a machine shop.

works would be amazed at the wonderful transformation which the last few years have seen down Warple Way, and the process is still going on. Yet as one walks through the offices and through shop after shop, with its rows of machine tools, and notes the well-ordered way in which process follows process from the time the idea is first sketched out on paper until the final stage of production is achieved, it is difficult to realise that one is not viewing a modern factory all fresh from the builder's hands. It is a tribute to the splendid foresight of those who have guided the destinies of the C.A.V.

important Government work, but at the same time the output of accumulators, magnetos and aeroplane engine starters is, to put it very mildly, quite respectable. And the firm is not sitting still like Mr. Micawber waiting for something to turn up. Immediately the time comes they will be ready to go full speed ahead on electrical equipment, and there is little doubt that they will win through. All their staff are being trained in doing highly delicate work, and here a word may be said as to the success which has attended the firm's efforts at the dilution of labour. For many of the processes girls are now



THE C.A.V. WORKS.—The dynamo shops on the left and accumulator charging department on the right.

works that the growth in the size of the works and its organisation has gone on so smoothly and continues to do so. Having utilised all the site around the original works, the firm have been fortunate in obtaining space just across the road, where a new large factory is already in use, and further extensions are going up. Some idea of the extent of the

enormously employed, and are doing splendid service. For delicate work of a repetition nature which is such a feature of electrical manufacture, their quick and delicate touch lends itself very readily, and in the C.A.V. works considerable attention is given to details which will not only facilitate their work, but also eliminate, as far as possible, opportunities

for making mistakes. Thus, to mention but one instance, the armature shafts of all models of the C.A.V. lighting dynamos are made the same size, but the windings differ, of course, and the insulation on the armature wire of each model is given a distinctive colouring.

The same thoroughness is seen in connection with the selection and employment of materials, a well-equipped testing and research laboratory being kept fully employed testing not only the quality of the material in use but also investigating the possibility of utilising new ideas which may be suggested from time to time.

Throughout the works every effort is made with a view to attaining the maximum efficiency of the employees whatever position they occupy. Thus, those in charge of various operations or departments have their own offices so that they may carry out their work undisturbed. The health of the workers is wisely treated as of most primary importance, all the shops being noticeable for the amount of light and ventilation which is afforded. This aspect of the entire works struck us in a very marked degree. In winter the air is heated, while in summer the temperature is kept down. In those shops where there is a lot of dust collectors are arranged to suck up the dust as fast as it is made. Shower baths and wash-houses of most up-to-date character are also provided. A new departure which is sure to be greatly appreciated is a large canteen, now nearing completion. It includes separate

dining halls for men and women either of which is large enough for concerts, &c. As a matter of fact, even before the building is finished it has already been decided to extend it, so confident are the firm that it will be appreciated by their workers. This new building is no flimsy structure suggesting a temporary institution. It is not only very handsomely built, with a very attractive elevation, with red tiled roof and stone façade, but the interior design of the roof is particularly pleasing, and as a whole is typical of the substantial character pervading the whole organisation.

In the C.A.V. works Mr. C. A. Vandervell has, indeed, erected a monument to his name, and is to be heartily congratulated on having brought together into the business such a number of highly efficient co-workers, headed by Mr. A. Goodwin, who is not only highly respected, but who has with him the goodwill of every employee in the large range of buildings. Mr. Steel, the works manager, is another man who has proved such a strong pillar in the building up of the organisation, this side of his work amounting almost to genius. It is long since we had so pleasurable an experience as the inspection of the developments which have taken place at the Vandervell works, and if ever a business slogan were justified that of the firm surely is, which reads: "If you see the signature C.A.V. stamped on an accumulator, you know it is the best." And this applies to everything turned out from the Vandervell factory.

The Engineering Timber Co., Ltd.

NOTE should be made of the fact that the Engineering Timber Co., Ltd., have now moved into their new offices at 11, Victoria Street, London, S.W., next door to their old headquarters. The telephone numbers remain as before, Victoria 5073 and 4210, and the same applies to the telegraphic address, Entikosil, Vic, London.

The Lodge Sparking Plug Co., Ltd.

ANOTHER move is that of the Lodge Sparking Plug Co., Ltd., who from Saturday next, September 23rd, will have their registered offices at their new factory in St. Peter's Road, Rugby. All communications should be addressed to the Lodge Sparking Plug Co., Ltd., Rugby. The telegraphic address is "Igniter, Rugby," while the telephone call is Rugby 235.

An Addition to the Castrol Ranks.

MR. D. W. THORBURN, who is so well known in circles aviatric, has joined Messrs. C. C. Wakefield & Co., Ltd., as Chief Assistant to Mr. Frank Fisher, the manager of the Motor and Aviation Department. The popularity of Castrol and other Wakefield products has so greatly increased the demand that of late it has been a severe tax for even Mr. Fisher's boundless energy and enthusiasm, and the co-operation of Mr. Thorburn, with his originality and ability, should provide considerable relief.

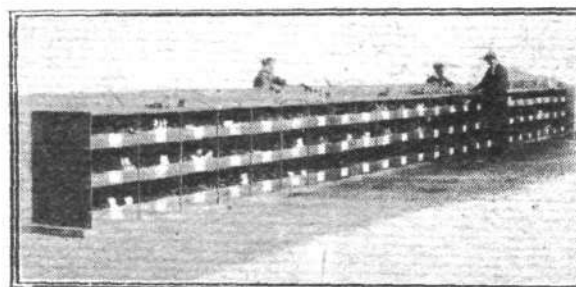
A Tribute to Barimar Welding.

FROM time to time reference has been made in these columns to the splendid work done by the welding department of Messrs. Barimar, Ltd., 10, Poland Street, W., who have made a speciality of this kind of repair for a long time. Striking tribute to the effectiveness of their system in dealing with extremely delicate welding operations has recently come to hand in connection with certain German machines. Writing the other day to the firm, the owner of a large industrial concern in the Midlands said:—"We have a particularly delicate welding job we should be glad to have your opinion upon. Up to the present, as far as we are aware, there is no firm in the whole of England who can successfully do it. We are given to understand that the men who do this work in Germany are trained to it from childhood. The thickness of the metal is certainly not more than the .005 inch, and inasmuch as the insulation of the apparatus goes within one-eighth of an inch of where the weld is, you will readily realise that a man has to be exceptionally expert if he is able to avoid damaging the article."

As there were 1,000 of these machines needing repair, Barimar, Ltd., were given a trial order. Fortunately, there was no difficulty in proving that their experts were quite equal to the emergency. The perfectly adjusted apparatus was soon on its way back to the owner, and a contract was immediately entered into in respect of the rest of the installation.

This is but another instance of the way in which Barimar, Ltd., have come to the rescue of firms who were threatened

with having their output curtailed owing to the breaking of machinery of foreign origin which could not be replaced. Working at such high pressure as many machine tools are at the present time it is inevitable that breakages will occur, and it is good to know of a firm which can deal with such repairs promptly and effectively.



A useful range of steel bins and counter made by Messrs. Joseph Sankey and Sons, Ltd., of Hadley Castle Works, Wellington, Shropshire. These can be supplied in various combinations and sizes specially suitable for use in aircraft works and hangars.

After Hours.

If we were asked to name the most delightful entertainment at the present moment in London, we should without hesitation give the palm to "The Happy Day" at Daly's. We are hardly surprised therefore to learn that, commencing from Monday, September 25th, Mr. Evett has arranged at Daly's to have an extra matinée on Mondays, in addition to the Wednesday and Saturday matinées. He considers, however, that nine performances per week would be too severe a strain for the artistes, and has therefore decided to cancel the performance on Monday evenings.

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